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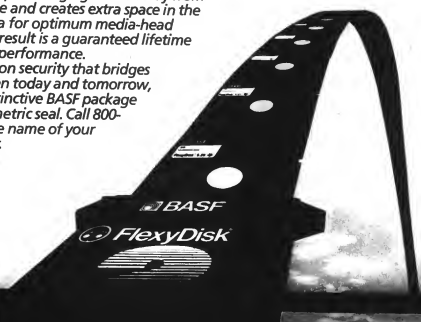
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John Whitmarsh

Source: VeriSign's Comprehensive Internet: the U.S. Computernetwork, Net Cdn, 2nd edn. Indianapolis, Mayfield, Allen Matheson, PC World, Ray, JS Magazine, 20 Allen Press Publications and On Communications.

Hackers have received a lot of publicity lately, and it doesn't always happen to the other guy. What's the state of your company's security?

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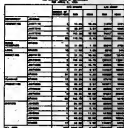
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Editorial

Users May Be Losers

The microcomputer software market was jolted into reality last year, and it wasn't a pretty sight. Too many vendors spent time chasing too few opportunities, resulting in unstable market conditions and the lingering question of what will happen next. During the last few years, vendors of all sorts rushed products to market in the wake of the personal computer explosion. Me-too products, poorly planned products and much needed products all jostled for the notice of the buying public. But in this day of cost efficiency, purchasers are getting tougher. To succeed, products must answer a business need and must also have that lucky mixture of strategy, marketing and timing. In the last year, the market has grown up and become more expensive. The cost of marketing and distributing software has made it more difficult for new companies to get into the market and stay in it. As a defense against this confusing marketplace, users are sticking with what they have rather than experimenting with the untried.

This reaction is understandable, but users may be the losers because of it. It is important to remember that software doesn't end at Lotus Development Corp.'s 1-2-3. The market is being held by a few products that gained popularity several years ago and have amassed a very loyal following. Research conducted by C.W. Communications showed that in 1984, Microsoft Corp., Lotus and IBM were the top three personal computer software vendors mentioned most by respondents. Although the market seems stuck with the old standbys, the next wave of software will not be too far off.

The trend away from single-user systems and toward multi-user systems will create the demand for new software to meet these applications needs. Niche products ranging from vertical applications and customized applications to after-market products for the major software packages will increase in market share.

It is the job of the MIS manager to keep this turbulent and confusing situation in hand. MIS managers have become responsible for selecting quality software for users' current and long-term needs. MIS managers must avoid the danger of underestimating what the personal computer can do. Too used to mainframe applications, MIS may be riding out this confusion in the market by staying with the best-known products, regardless of their organizations' needs. You as the MIS manager need to investigate what is out there and what's possible for users' needs. And above all, keep in touch with the user community. As they become more computer-sophisticated, their needs and desires for computer capability will also grow more sophisticated. MIS will have to keep up with these needs and, if possible, stay one jump ahead.

Art Rodes

Insider

How Much Longer?

By Tom Willmott

Microcomputer software gained identity as a distinct and financially promising high-tech market opportunity when VisiCalc burst on the scene in the mid-1970s. Industry lore attributes much of Apple Computer, Inc.'s early success outside the hobbyist market to this spreadsheet product. Of course, a wide variety of software programs were also available at that time for Radio Shack Corp.'s TRS-80 computers. But for the most part, personal computer users expected to write their own routines in Basic. VisiCalc was really the first program to deliver sophisticated computing power to an individual's desk for a price.

In 1981, the introduction of the IBM Personal Computer changed the information processing industry and legitimized the purchase of micros for large organizations. Data center managers who had perceived the Apple II as little more than a toy had to look twice at a product blessed by IBM.

In 1984 IBM probably generated more than \$4 billion in workstations and office system sales and shipped more than one million personal computers. From the microcomputer software perspective, this made a big business even bigger. For two years MS-DOS was the only development game in town.

The microcomputer boom also changed the way large organizations did business. Information systems managers accustomed to greeting the sales representative of a \$5 million to \$10 million software organization were forced to come to terms with three hackers from New Jersey whose total assets amounted to seven cases of Tab and a 1972 Chevy Malibu. One of the hottest products was 1-2-3 produced by Lotus Development Corp. In September 1982 Lotus was 17 people strong, renting space on the wrong side of Cambridge, Mass. In January 1983, they shipped their first box of software. Last month, Lotus announced that 1984 net income had doubled to \$36 million from the previous year. Revenue for the period was \$157 million. That's some distance from 17 cases of Tab.

But what of the future and the recent past? Three major market segments stand out in micro software. In application software, the most popular functions continue to be spreadsheets, data base, word processing and graphics, or some combination of all four. Frankly, the most interesting news in micro software in 1984 is that there wasn't any news. Lo-

tus continued to dominate the large organization market. A handful of new creative packages came on the scene. But at least two companies with imposing venture credentials disappeared into the sunset. For the most part, there wasn't much to get excited about in the applications arena. 1985 doesn't look much better.

Communications software was more interesting. A number of vendors pressed on with development of terminal emulation and virtual disk programs, sometimes categorized as communications management products. In addition, more than two dozen vendors, predominantly from a mainframe background, offered links between hosts and micro-based systems. Cullinet Software, Inc., Informatics General Corp., McCormack & Dodge Corp., Software International Corp., Mathematics Products Group, Inc. and others entered the fray. 1985 will be a year of testing and implementing these integrated micro-mainframe systems.

It's a grim day when most exciting news in the industry revolves around systems software. But the introduction of products that provide micros with multi-user capabilities, windows and concurrent processes turned out to be the sanest stuff of the year. It's not that we really need all that functionality quite yet. It's more that we've begun to glimpse how the markets will shape up in the next few years.

Topview from IBM, for example, suggests a proprietary systems software strategy that is a radical departure from IBM's strategy. The Macintosh windows are appealing and innovative. Development expenditures among the independent vendors for distributed operating systems are also a key to the future. And the jockeying between Microsoft Corp. and Digital Research Inc. is interesting.

Thus we begin 1985 patiently, or perhaps impatiently. Waiting for the real battle between IBM and Wang Laboratories, Inc. for WP dominance. Waiting for more software on the Mac. Waiting for something different and useful on the PC. Waiting for the implementation of micro-host communications. In this razor's edge, BMW 320i, Yuppie-driven, 45% growth-rate microcomputer world of ours, we're waiting for the newest of the new... the Lotus-Buster. Will the next genius please stand up!

■

Willmott is vice-president of user research and services for International Data Corp. in Framingham, Mass.

dB



BY RICH TENNANT

Bear With Us

A recent change in the USPS newspaper and magazine distribution systems has created a slowdown in delivery of *Computerworld Focus*. We are working diligently with postal and distribution authorities to normalize delivery. We appreciate your patience. *Focus* will appear 10 times in 1985. Send comments to The Editor, CW Focus, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Q & A

In 1982, a young man entered a New England engineering college as a freshman computer science major and aced every computer science course he took. He failed every other course, and after a year and a half, he and the school parted company. He was hired to work for a software consulting firm at a starting salary of more than \$25,000. He noted that, although he wishes he had worked harder at school, the average starting salary for computer science graduates from his would-have-been alma mater is no more than what he's now earning.

This young man claims to be knowledgeable about the techniques practiced by hackers. He shared some of that knowledge with Computerworld Focus for the benefit of our readers who might be having second thoughts about their own systems.

Do you know how to break into a company's computer mainframe?

Letters

Unix Alternatives

Computerworld Focus on Unix did a fine job of stating the pros and cons, but why did you choose not to expand the discussion to alternatives?

Most of the forthcoming seminars provide forums for topics like "Alternatives to Unix." In this way, they present the big picture. If you are indeed committed to a reporting style that would allow your readers to react to the "waves of change before they hit," how can you ignore the evolution in operating systems?

Dorothy A. D'Attona
Director, Corporate Communications
Multi Solutions, Inc.
Lawrenceville, N.J.

Opel...

This is probably one of a thousand letters that reminds you that we are in 1985, not 1984 (CW Focus, Jan. 16, page 5). We humans enjoy pointing out typos in prestigious publications. I have also saved a copy of the *New York Times* with the wrong date on the banner page.

Your point that Focus is our publication is well taken, and I would like to add an idea. As manager of international systems for a computer consulting firm, I have the opportunity to travel to a number of countries outside the U.S. It never ceases to amaze me that most people in our business have misconceptions about the state of technology in foreign lands.

On recent trips to Saudi Arabia, I have purchased and enjoyed Saudi Computerworld. When I returned with copies of the publication, people asked me basic questions such as "Where do Saudis get electricity?" not knowing that most countries are very much in the 20th century with computer technology.

A Focus edition on the subject "How is the rest of the world doing?" with articles contributed by the CW foreign editorial offices would be of great interest to a growing number of people in the computer field. I have enjoyed Focus and the foreign editions. Keep up the good work.

Dennis J. Clark
Manager, International Systems
MDC Systems Corp.
Philadelphia

That's what I do every day. Actually, I'm not busting in; I have permission. I make the personal computers speak with the large ones. For instance, the personal computer will think that the larger computer is a disk drive and that it can be accessed and things can be stored on it just like a disk drive. A large computer just thinks it has another terminal on it. And data files, for example, can be transferred between the two.

It was my impression that if you had a computer, a modem, emulation software and a good mind, you could get into other computers.

No problem. I do it often—it's fun. In

fact I'm going to do it tonight. For instance, one of my typical things is getting [long-distance phone service company] secret codes so I can make free long-distance calls. I write a quick program on the computer to dial up the [company's] number and just start trying secret codes and it makes a list of all the codes that are valid. I'll go through that list until the code is taken off—maybe when somebody wants their code changed. I don't abuse the code because I would get pretty upset if somebody was doing that to me.

You restrict the number of calls you put on somebody else's number?

I try to. I got a [company] master pass-

word recently. That's been working for a few months, and it belongs to nobody. It was just a password left on the system; I've been calling all over on that one. I prefer the master password because you don't do any damage to anybody.

Have you ever gotten into any other mainframes?

"I was hired to try to break into a mainframe to test its security. I said I could probably break into it, but I couldn't. It was very good security. There were some flaws and if I put more time in, I could have gotten past it."

A lot of things can be done to prevent
(Continued on Page 42)

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In the News

No News is Bad News?

It seems to be the case these days that the big news isn't what is happening, but rather what isn't.

What may not be happening is the first-quarter 1985 release of DOS 3.1, without which the file server function on the IBM Personal Computer AT cannot be used. Because many companies purchased the AT for its file server capabilities, the delay of 3.1 will certainly be a disappointment.

Tom Willmott, vice-president of user services at International Data Corp. (IDC) in Framingham, Mass., confirmed the existence of technical problems in the AT world. Willmott pointed specifically to the Sytek, Inc. network, the hardware side of the 3.1 release of DOS, which he said was not being delivered on time either. He said he would not be surprised if delays in delivery occurred.

"IBM would much prefer that you do the right thing by them by buying either their own line of controllers or their own 36s and get into a star configuration. So if it's been delayed from a marketing standpoint, that wouldn't surprise me either," Willmott said. Many people bought ATs because they were simply more powerful processors and the 80286 technology would allow for retrofitting in a multiuser operating system, according to Willmott. "It's clear that connecting them in work groups is important, but I still maintain that while that's one product strategy, clearly IBM would prefer to hook them through controllers and 36s into a host-based system. That's how they make their real money," he concluded.

While rumors fly about the delay of the Infant AT, IBM is doing its best to quash them. When asked to confirm rumors that 3.1 will not ship in the first quarter, a spokesman for IBM in Boca Raton, Fla., said IBM has made no announcement to that effect. With the first quarter almost over, such a statement may seem like the Long Blue Line, but the IBM representative stated further that the previously announced schedule has not been changed.

Crackdown On Copying

The powers that be at Wilson-Jones Co., the Chicago office supplies and equipment concern and a subsidiary of American Brands, Inc., a Fortune 100 conglomerate based in New York, probably wish they hadn't liked Micropro International Corp.'s Wordstar quite so much. Micropro and the Association for Data Processing Service Organizations, Inc. (Adapso) filed a joint suit on Jan. 17 against Wilson-Jones and its parent corporation for \$225,000, alleging software piracy.

The Wilson-Jones suit is the latest in what appears to be a serious effort on the part of software development firms to crack down on unauthorized use of microcomputer software. According to a survey conducted by Future Computing, Inc., a market research organization in Richardson, Texas, software developers and vendors have lost an estimated \$1.3 billion in revenues in the last three years.

Although many software firms have been moderately successful in copy-protecting their packages, a number of oth-

ers choose not to bother. IBM, has never attempted to copy-protect its packages. In fact, user manuals for its stand-alone Displaywriter and its microcomputer clone, Displaywrite 2, include detailed instructions for making backup copies. A source contacted at IBM said the company has been looking at methods of copy protection, but "there is no strategy at this point, so the answer is that we have no plans at this point in time to implement copy-protection procedures."

Among the methods suggested to stem the rising tide of piracy is Adapso's proposal to combine a lock in the software program with a hardware key to plug into a box in the RS-232 port on the microcomputer. Not only would this dis-

allow unauthorized access, but it would also make it difficult to use the software on more than one computer.

Amy Wohl, president of Amy Wohl Associates, speaking at the Office Automation Conference in Atlanta recently, blasted Adapso and referred to the proposal as "absolute nonsense." Wohl stated that because the cost of software is prohibitive in a multiuser organization, software vendors need to heavily discount volume purchases.

Dave Sturtevant, senior director of public communications at Adapso, the Arlington, Va.-based organization that represents 750 companies in the computer software and services industry, said that since most software is purchased

from retailers, control of volume discounts would be very difficult. He also stated that the copying that is going on is not exclusively within the Fortune 500 or Fortune 1000 corporations. He referred to such copying as an "epidemic situation nationwide" and added that a technical solution is the only solution. Sturtevant feels that the lock and key mechanism would not be as burdensome as its prepopularity would indicate. A user who wanted to use the software on a home personal computer could accomplish this by taking the key, the lock and the program disk home.

When asked about dedicated use of the RS-232 port, he said that the lock would be a pass-through and would not

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In the News

prevent use of the RS-232 port for other purposes. Regardless of the outcome of the Adapto-Microport suit, a serious need remains to address the needs of the large multiuser community. Few companies would choose to spend \$100,000 or more for multiple copies of a software program if a legal alternative were available. The alternative may come in the form of good decision support software for the mainframe. Members of the user community agree that in the not-too-distant future similar operating systems will be compatible in both the mainframe and microcomputer environments. Unless the software houses find a cost-effective solution to multiple purchases or multiple licensing agreements, corporations may soon elect

to use mainframe software for their decision support needs.

Now might be a good time for software developers to make their products more economically appetizing.

AT&T, EDS Sign Pact

AT&T recently signed a seven-year contract with Electronic Data Systems Corp. (EDS), acquired by General Motors Corp. in 1984, to jointly market computer and communications systems. With the agreement, AT&T will work with EDS to design and market vertical applications, specifically targeting the automotive industry.

AT&T had previously attempted to

market an integrated system, the Net 1000, to Ford Motor Co. Last year, Ford stopped testing the system, which had cost AT&T an estimated \$1 billion and 10 years.

Kim Myhre, director of communications industry research and office automation marketing planning service programs at International Data Corp. in Framingham, Mass., said that he did not see that the contract would have any effect on IBM or on its newly acquired telecommunications giant, Rolm Corp. Myhre stated that GM has been looking to develop its own network and that GM currently uses a lot of AT&T leased facilities. "AT&T, with its information network-type product, the NET 1000, has to

establish some vertical direction. The deal that [AT&T] signed with EDS has a lot to do with developing GM's own network." According to Myhre, the implications for IBM, if there are to be any, would be long term. He said Ford turned down the NET 1000 because it was too expensive and weak on the applications side. "What AT&T was really selling there was communications facilities. What they didn't have to offer was processing services—value-added services—and now they're developing that in conjunction with GM." He stated that AT&T might remarket the applications part of that service to other automobile manufacturers, but that IBM will probably stick with its own applications-specific networks. In particular, Inet, a value-added network for the insurance industry.

It is not likely that IBM and AT&T will move quickly into a head-to-head position on any applications-specific markets, Myhre said. "Quickly? The value-added network business is not a 'quickly' business."

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Surprise Move

In other news from Big Blue, it came as a surprise to many when it was announced recently that IBM had decided to move marketing and sales responsibility from the Entry Systems Division in Boca Raton, Fla., to its National Distribution Division (NDD) in Montvale, N.J.

An interesting point is that the National Distribution Division is the group that already handles personal computer sales to its own IBM Product Centers, which are in direct competition with the retailers. It remains to be seen whether the retail outlets will continue to get IBM Personal Computers and ancillary products as quickly as they have in the past.

However, the retailers see the move as an extremely positive step. Barbara Millard, president of ComputerLand Corp., the largest of all the retail chains with 700 computer stores worldwide, stated that IBM's divisional change was "a move in the general direction of making available products we never before have handled." Bert Helfinstein, vice-president of operations at Enter Computer Centers, the largest publicly held retailer of microcomputers in the country, expressed pleasure at the move. "Competition from the Product Centers has never been an important factor in this business and it doesn't bother me at all that the NDD also operates the retail centers." Helfinstein felt that the consolidation of marketing efforts will actually improve things for the retailers. "NDD is the part of IBM that is most attuned to third-party distribution. I think it further reaffirms IBM's long-term commitment to third-party distribution as a means of reaching the end user with its products," he continued. Helfinstein did admit that there are chronic questions regarding IBM's commitment to retailers, especially from the financial community.

An IBM spokesman was quick to echo the positive response of retailers and industry watchers. "The [non-IBM retail] dealers will continue to have the same day-to-day IBM contacts. The people within IBM remain the same, it's just that they happen to report to a different division. In the long run we expect the new organization to enhance the business prospects for the dealers."

In Brief

Last month's issue of *Computerworld Focus* noted the merger of NBI, Inc., the word processor manufacturer in Boulder, Colo., with Computer Counselor, Inc. (CCI), of Rochester, N.Y., a supplier of applied computer systems in the telephone and office systems market.

At that time, Herman A. Affel

Jr., CCI's chairman of the board, and Thomas S. Kavanaugh, president of NBI, issued a joint statement expressing confidence that the two companies complemented each other and represented a formidable combination of distribution, products, technology and customer support.

Well, maybe not complemen-

tary and formidable enough. On Feb. 6, 1985, in another joint statement, Affel and Kavanaugh said that "after careful study, we have jointly concluded that merging the two companies would not have been in the best interests of shareholders and employees."

DALLAS — Seven computing industry pioneers have

been named to the Information Processing Hall of Fame, established by Infomart in Dallas, to recognize the most significant scientific, technological and business contributions made by individuals in the information processing industry.

Named as the seven members were John von Neumann, John Mauchly, J. Presper Eckert,

Grace Hopper, Gene Amdahl, Jack S. Clair Kilby and Frank Lautner.

NORWALK, Conn. — Management information systems (MIS) and data processing executives are still searching for share-to-mainframe commercial software that is easy enough for untrained personal computer users to run without extensive MIS support. These executives also plan to use personal computers for electronic mail, but haven't found an appropriate link, according to the survey section of a new directory of MIS/DP executives published by International Resource Development, Inc. (IRD).

This directory costs \$595 and is available from IRD, 6 Frowitt St., Norwalk, Conn. 06855.

HOUSTON — The Compaq Computer Corp. Portable is the most highly rated personal business computer, according to a recently completed 1984 study conducted by The Yankee Group. The study by the Boston-based market research and consulting firm shows the Compaq Portable received the highest overall rating, 3.1 on a 4.0 scale, moving up from Number Four ranking in 1983 and displacing the IBM Personal Computer XT as the top-rated model. The Yankee Group is based in Boston.

NEW YORK — Service and repair of computers and telecommunications equipment will double by 1990 to become a \$46 billion industry, according to a recently released report commissioned by the Association of Field Service Managers (AFSM) and prepared by Arthur Andersen & Company.

The results of the study, which surveyed more than 100 service executives and customers, is intended to supply providers and users with market information.

The report found that the fastest growth segment will be office automation systems, and the service revenues for such systems will increase by 33% annually, to \$8 billion by 1990. As the market moves away from mainframes and minicomputers, product manufacturers will begin to lose shares of service revenues to third-party service providers and self-service by customers.

Of particular interest to mid-tier user companies, is the prediction that many major manufacturers, such as IBM and Wang Laboratories, Inc., will offer service for competitive products that are networked with their own.

The complete report, "Future Trends in Service of Electronic Products," is available for \$100 from the Association of Field Service Managers, Suite B, 6237 Presidential Court, Fort Myers, Fla. 33907.

SOME LIES YOU HAVE TO BE BROKEN

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In the second half of 1984, several expert systems, or knowledge-based software programs for microcomputers were announced, most available for less than \$500. With these systems, the "what-ifs" and "if-thens" transcended number crunching and entered the real world of decision making. This new decision support software for microcomputers was a spin-off of an exciting subfield of computer science known as artificial intelligence — programming a computer to access a huge knowledge base, to apply certain known parameters to this knowledge base and to come up with conclusions based on all available information.

Upper management is starting to take artificial intelligence seriously because of the tremendous amount of information that can be put in to make the system "smart" and the ease with which this information can be accessed.

As long ago as the mid-1950s, researchers in the burgeoning field of artificial intelligence were programming computers to play chess and bridge. These games were probably chosen over pinocle and bingo because researchers wanted to prove a point: If a computer could play intellectually taxing games such as chess and bridge and beat a human opponent, then a computer must be smart. In truth, of course, programmers had input basic rules of the game, probabilities for moves and countermoves and some rules of thumb (heuristics). On the surface, it appeared computers had been taught to think; in actuality, computers were guessing. The guesses were successful more often than not because so much information was available, and the computers could access it with lightning speed. Most human minds cannot do as well.

Artificial intelligence has come a long way in the past 25 years. There are a number of good software programs that run on mainframe computers. And in companies with large computer systems, upper management is starting to take artificial intelligence seriously for two main reasons: the tremendous amount of information that can be put into the computer to make it "smart" and the ease with which this phenomenal amount of information can be accessed. No longer does computerese have to be used to instruct the computer. The information obtained from a simple command such as "Let me see the names and addresses of all the women in the Silicon Valley who earn more than \$50,000 a year and drive a foreign automobile" can mean a great deal to the American automobile industry.

This same information would also mean a lot to the owner of an automobile dealership in San Jose, Calif. However, unless the owner has a very, very large computer, it will not be available to him. Microcomputer-based expert systems provide a practical and expedient solution for both the small-business person who uses a microcomputer in day-to-day operations and for the manager of a large corporation who needs some decision-making capabilities but has no need to access the corporate data base.

It is surprising that leaders in the field of artificial intelligence have not jumped on the miniaturization-for-micros bandwagon. Brenda Nashawaty of Artificial Intelligence Corp., a mainframe-based artificial intelligence firm in Waltham, Mass., said that company has changed direction and will not put out a microcomputer-based artificial intelligence or expert system. She stated that because reception to the firm's mainframe product, Intellect, has been so positive, the company has decided to put more of its resources toward enhancing Intellect.

She does, however, think that a good expert system can exist on a micro. "One of the reasons we decided to postpone any

release of a [microcomputer-based] product from our company is that we really want it to be the best it can be. Frankly,

we see a better market for it along with the mainframe and minicomputer markets, and we're going to start looking into that area for research and development."

There are those who do not agree a true expert system can be compatible with microcomputers. Robert Keller, president of Renaissance International, a Harvard, Mass., management consulting firm specializing in artificial intelligence, said, "[Expert systems for microcomputers] are interesting toys. It's not that the products themselves are bad; in fact, they're fairly sophisticated. But it's hard to do serious knowledge-based system work on a personal computer, since [the machines] are not very fast and usually don't have much storage." Keller added that they could be rather valuable tools if

Dumb.



Stand-alone programs can't be made to work as a system no matter how hard you might try.

Stand-alone programs are fine. Unless, of course, you need them to work together. Because the sum of the parts will never equal a whole.

That's why even the highly touted WordStar,*

dBase II* and 123,* programs don't make sense as a business system.

They were designed to perform very specific application functions only, and therefore, make miserable workmates.

Fortunately, there's a smart solution. It's the new Smart Software System.

Smart's unique "modular integration" is the key to productivity. It means that The Smart Word Processor, The Smart Data Manager

used on a microcomputer with a fast processor and hard disk. Another limitation is the amount of information with which the computer must be familiar in order to provide valuable output. The old computer adage, GIGO (garbage in, garbage out) could be amended for expert systems to DIDO (data in, decisions out). Keller prefers the term knowledge-based system to expert system simply because the amount of information necessary to make a system "expert" would be so great. The difficulty would lie in three areas: Much time would be spent keying information (most management-level people are not known to be speedy typists), random-access memory (RAM) on microcomputers is severely limited and few true experts are around to feed the machines.

Whether this new software is called

Some believe true expert systems are not compatible with microcomputers because micros don't offer adequate speed or storage. Micros are also limited because of the amount of information the computer must be familiar with if it is to provide valuable output.

decision support, expert, artificial intelligence or knowledge-based is a matter of preference. A sampling of the newest pro-

grams on the market is spotlighted below. All will run on IBM Personal Computers or compatible machines.

Although minimum requirements of memory and disk drives are noted, it should be borne in mind that, with the exception of Human Edge Software Corp.'s Mind Prober, these requirements are indeed minimums. If microcomputer users wish to run complex models, the machines should be configured with much larger amounts of RAM, have swift microprocessors and be equipped with hard disk drives.

Expert Choice (Decision Support Software, Inc., McLean, Va.) is a decision-support package designed for the executive or consultant. It provides a generic format that resembles an inverted tree, with the goal at the top of the tree and the criteria, the branches. Once criteria are established, Expert Choice leads the user through three types of comparisons: importance, preference and likelihood. If the comparison is verbal, elements are rated on a scale ranging from "extreme" to "equal." If the comparison is numeric, the values assigned range from 1.0 to 9.0, with 1.0 being equal. Based upon the weights the operator establishes, the software offers conclusions. At any time, the operator can change the importance of the criteria as more information is available.

Of particular interest in Expert Choice is the inconsistency ratio. If the values assigned to the various criteria are inconsistent, the decision reached will be meaningless. Expert Choice will let the operator know if the inconsistency ratio is high; then the operator can go back through the decision tree and change some of the comparisons.

Expert Choice lists for \$495, runs on an IBM Personal Computer, Personal Computer XT or 100% compatible PC-DOS microcomputer with 128K bytes of RAM and one disk drive.

Lightyear (Lightyear, Inc., Santa Clara, Calif.) is a particularly easy-to-use expert system that affords great flexibility. The number of alternatives and criteria are limited only by the available RAM. For example, 50 alternatives with 100 criteria require 256K bytes, while 1,000 alternatives with 100 criteria require a fully loaded 640K-byte system.

The manual is small and extremely well written. It assumes marginal knowledge of the computer. Two completed examples are already on the disk that Lightyear provides, and the third example is created interactively, using the manual. Esther Dyson, president of Edventure Holdings, Inc. in New York, stated in *Release 2.0*, "Lightyear is actually fun to use; quick and interactive... [It] can be used for everything from job candidates to loan approvals."

Because all the expert systems are geared to upper management, Lightyear's ease of use could make it an excellent bet. Lightyear retails for \$495 and runs on IBM PC, XT, AT and other 100% compatibles using PC-DOS or MS-DOS version 2.0 or above and 192K bytes of RAM and one disk drive.

Trigger (Thoughtware, Inc., Coconut Grove, Fla.) differs from Lightyear and Expert Choice in that it is more a monitoring device than a decision-making one. It actually seems to take project management software, like Harvard Software, Inc.'s Harvard Project Manager, a few steps further. Mary Harrison, of Corporate Software, Inc. in Waltham, Mass., does not consider Trigger an expert system, referring to it instead as an

Smart.



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"executive tool." She found it extremely easy-to-use, especially the tutorial on Managing by Exception. Asked to compare Trigger functionally with Lightyear, she said, "Trigger was designed for overall management of different functional areas within a company; Lightyear is really geared more toward decision-making."

Thoughtware, Inc. has recognized that written documentation is as important as interactive diskette-based tutorials and provides both, equally well done. Trigger runs on an IBM PC, PC/XT or IBM-compatible with 128K RAM and two drives. It retails for \$495.

Mind Prober (Human Edge Software Corp., Palo Alto, Calif.) is really more of a toy than an expert system, although the principles are the same. The user creates a file with the name of the person being

The computer can keep track of a large number of variables better than any human mind and can come to a conclusion. Remember, however, that the weight attributed to each criterion is highly subjective and conclusions could be biased.

"probed" and assigns an "agree" or "disagree" to many screens of adjectives. Mind Prober then generates a report, ba-

sically a personality profile, that tells the user how that person copes with stress, behaves in relationships, feels about sex

and work and explores personal interests. Mind Prober cannot be considered a business tool; however, it could be good training for those who regard computers with fear and loathing or who will later use more complex expert systems. Human Edge also markets The Communication Edge, The Management Edge, The Negotiation Edge and The Sales Edge and has acquired the North American marketing and distribution rights to Intelligent Terminals Ltd.'s Expert Ease.

Mind Prober is a one-diskette program that runs on 64K bytes of RAM and is compatible with the IBM Personal Computer, Apple Computer, Inc. Apple II and Macintosh, Tandy Corp. TRS-90 and Commodore Business Machines, Inc.'s Commodore 64. The Commodore 64 version is \$29.95, and each of the others costs \$49.95.

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What is the real value of expert systems? Can companies rely on the conclusions reached? The answers are very valuable, if used correctly; and, in general, no. If a high-level manager wants to assess the advisability of relocating company headquarters to one of six cities based on criteria ranging from interest rates to leisure activities, an expert system is a good tool. The computer's memory can keep track of a large number of variables better than any human mind, and the software can apply the knowledge supplied by the manager and the heuristics to come to a conclusion. What should be remembered, however, is that the weight attributed to each criterion is highly subjective, and conclusions could therefore be considered biased.

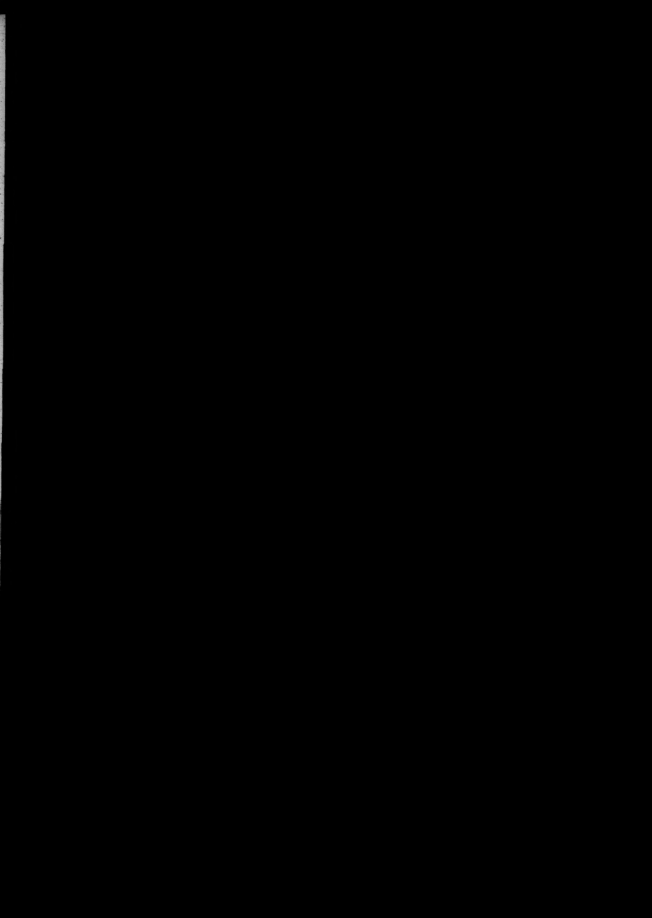
But there are ways in which expert systems can be used to good advantage. In order to overcome the argument that data in (BI) would slow decision out (DOI), the systems could be used with good results as an adjunct to brainstorming. If six people were providing input, results might have more credibility; at the very least, audit trails are provided, backtracking is easy and changes can be made with little problem.

Another good use might be to provide concrete reasoning for a decision already made. But are decisions really made based on intuition alone? Corporate America might not admit it, but it does indeed happen.

Perhaps Robert Keller of Renaissance International put it best when he said the future evolution of artificial intelligence or expert systems is largely philosophical at this-point, and companies that considered building their own expert systems are realizing what a monumental task it is. What companies are waiting for, said Keller, are products that have knowledge bases already built into them. "People are coming to realize that the techniques of artificial intelligence are in fact simply a set of tools that can be integrated into any data processing operation."

Expert system software for micros may be toylike and is obviously not taken seriously by companies that provide artificial intelligence for mainframe computers, but when a large system has a start-up cost of \$50,000 to \$100,000 and the microcomputer software costs less than \$500, it just might do nicely until the real thing comes along.

While is senior writer at Computer-world Focus.





Forging New Micro Software

By Leonard P. Bergstrom
And Douglas Crawford

literally driving mainframe developments, particularly in the area of improving the user interface.

Choosing an appropriate computerised system has become a more perplexing assignment than ever before. The advent of the microcomputer and the concurrent explosion in software and potential for distributed data processing have made a difficult task even more difficult. A wide and ever-expanding range of software is currently available to support microcomputer activities.

On the corporate level, this software can be divided into three categories:

- Stand-alone micro products.
- Linked micro/mainframe products.

- Micro implementation of mainframe products.

Each approach embodies different philosophies, capabilities and levels of complexity, and each has positive and negative aspects. Further, each approach involves a different level of management decision as issues like control, access, integrity and data sharing become increasingly important.

The first category, stand-alone micro products, represents a low-risk, low-cost method to exploit the benefits of personal use and user-developed applications. Stand-alone products such as Ferox Microsystems, Inc.'s Endcore! and Ashton-Tate's Dbase III offer independent users a significant capability and a shorter, less rigorous development cycle than most mainframe systems. Consequently, they

present themselves as tempting solutions to a wide range of problems. In a small business environment, an independent micro can be a useful and effective tool; in a larger corporation, this same micro system can be the source of duplicated effort and inconsistent data.

The biggest problem with such packages is that they are stand-alone to the extent of being isolated. Such isolation covers many areas; chief among them is access to corporate data, training and application support. Users can begin to feel assured that their needs will be addressed only when such products become true standards in their own right (for example, Lotus Development Corp.'s 1-2-3) or when they significantly displace main-frame package capabilities (as is the case with many of the micro-based modeling

packages). Even in these instances, users are at a disadvantage in two areas. First, users must rely on the management information systems (MIS) group for data extraction; second, users will either need to be trained in the use of data transfer tools or will require applications to perform such activities.

In this context, less opportunity exists for small independent software vendors. Products from these vendors tend to be purely micro-based and to lack both attributes mentioned above—the ability to set standards and the ability to displace functions. Furthermore, the pressure has increased as giants like IBM, large software houses like Bullfinch Software, Inc. and traditional computer manufacturers like International Business Machines Corp. and International Information Builders, Inc. have entered the marketplace. Many small vendors have reacted by either concentrating on vertical markets or actively seeking larger partners that can provide the coverage, the promotional muscle and the research and development expense and man-years of effort required to remain competitive. The bright spot for the small vendor with a personal computer in the attribute of being able to set standards will require more than a little assistance to be a commercial success today.

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MWC86 is the easiest to use of all compilers. One command runs all phases from pre-processor to assembler and linker. MWC86 eliminates the need to search for error messages in the back of a manual. All error messages appear on the screen in English.

A recent review of MWC86 in *PC World*, June, 1984, summed it up:

"Of all the compilers reviewed, MWC86 would be my first choice for product development. It compiles quickly, produces superior error messages, and generates quick, compact object code. The library is small and fast."

will not content in write the best C compiler on the market. To advance the state of the art in software development, Mark Williams wrote *cod*.

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multicomponent systems with intelligent micro and mainframe links. These products take advantage of each component's strengths; the micro's ability to provide a flexible and friendly user interface and the mainframe's capacity to store and allow rapid processing of large amounts of data.

Examples of the linked workstation category of micro software include the Golden Gate package from Cullinet and the IT series of products from Martin Marietta Data Systems, Inc. These offerings are linked to mainframe software (Cullinet's IDMS-R and IDB and Mathematica's Ramis II, respectively) to provide access to data and electronic communication facilities. The more overlooked aspects of such offerings are the data communications and electronic mail capabilities rather than the spreadsheet or data management capabilities. The communications component is important because it gets data back and forth between mainframe and micro and ostensibly offers some measure of control for the DP group. Electronic mail is important because it potentially provides a heretofore unavailable service. The spreadsheet and data management facilities of such offerings are not as important; they lack the clout of Lotus 1-2-3 for spreadsheets and do not effectively displace mainframe capability. In fact, they offer significantly less than mainframe data management capabilities.

The status of existing micro software — both stand-alone and linked via a communications component — is similar to that of mainframe software a few years ago. On both levels, two approaches have been used to satisfy various functional software requirements. According to one philosophy, everything needed by the user should be embedded in a single product because when you are in it, everything is readily available for use. Other systems adopt the philosophy of concentrating on specific activities and providing interfaces to other products. A popular example of this component approach on the IBM mainframe level is dubbed Pits (Focus, IFPS, Tell-a-Graf, SAS Institute, Inc. SAS) which covers such capabilities as data management, report writing, financial modeling, graphics and statistics. Historically, component products that perform one area of activity very well and do, not try to be all things to all people have enjoyed the greatest success. Perhaps the mixed reception accorded products like Framework and Symphony is because users don't want or

need the additional features — Lotus' 1-2-3 is enough.

Integrated micro packages and inconsistent micro/mainframe offerings also raise another question. How many tasks are management level personnel interested in or required to learn? The answer seems to be a limited set of tasks, at least if the experience of 1-2-3 vs. Symphony is any type of guide. Why, then, do we assume that if someone is do-

ing data management on a mainframe they will find it desirable to learn a second language to do the same thing in a more restricted way on a micro? Such a scenario favors a consistent micro implementation of mainframe products.

There are many decision support systems packages in which almost all of the functionality of the system has been transported to the micro; this approach gives

users a cheaper development resource combined with a data communications facility, as well as mainframe resource for larger tasks.

The same statement can be made about certain data management packages such as Focus, Info and Oracle, which have provided consistent micro implementation over the past two years. Such implementations provide a comfort level in MIS

managers not found in some other packages. In many cases these packages provide a "back of the book" answer to micro software purchases.

Consistent packages significantly reduce training and support requirements and provide a flexible range of computing options for users.



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Focus, authored by Information Builders, Inc. (IBI) is a prime example of a successful micro implementation of a mainframe product. The micro version introduced new ideas about user interfaces (for example, *Tabletalk*) being developed for the mainframe package. In addition, the micro version allowed IBI to transport its product to Digital Equipment Corp. and Wang Laboratories, Inc. microcomputers. The trend to micro software driving mainframe developments and integration across diverse hardware and operating systems is expected to be a continuing challenge to the software industry.

Many users of micro-based systems find that although they were initially satisfied with a product's capabilities, continued exposure to the product leads

them to want more. They come to want enhancements and additions to the basic applications. When these requirements become large enough, either the hardware or the software cannot accommodate the changes. This problem seems less important if the IBM Personal Computer AT can be seen as shortly becoming a low-end business microcomputer and if software developers continue their current trends. But many new users are faced with conversion to a mainframe installation using a different product. Instead of being a threat to in-house information centers, micros often further foster the need and desire for still more computer applications, especially those with greater sophistication. "Computer literacy," born from micro usage by the average analyst or manager, creates a

vastly increased need for the in-house information center.

Sooner or later the needs of users within large companies tend to focus on mainframe capabilities. The mainframe plays a significant part — whether for larger storage and computing capabilities or for that basic necessity of computer file, data. Whether this belief reflects reality or not, users do perceive microcomputers as being easier to use. The longer micros are in use, the greater the need for the mainframe.

Of the many players currently in the software arena, IBM's developments bear the closest scrutiny. IBM has been extremely active in micro and mainframe

software. Although the company has made some arrangements with a number of noted OSS vendors (Comshare, Inc., Economic Sciences Corp., EPS, Inc. and Execucom Systems Corp.), its major activity has been focused internally. In addition to the release of DB2 and SQL/DS, as well as the appearance of QMF, a unifying front-end, IBM has announced a number of products geared specifically at the information center marketplace.

IBM's new thrust into micro software with its Personal Decision Series offers some practical solutions to many of the major corporate challenges in supporting personal computing. The Personal Decision Series is a set of related micro software designed for business and professional users. At the core of the product set is the IBM Data Edition, which is a prerequisite for the other offerings. As an integrated data manager, Data Edition provides capabilities similar to many

**The longer
microcomputers
are in use, the
greater the need
for the mainframe.**

stand-alone products and offers a host of capabilities in the areas of file handling, data entry, query, reporting and application development. What differentiates Data Edition from other products is its ability to access information from other members of the Personal Decision Series, from public data bases (for example, Dow Jones) and from the accounting software available on the PC-based IBM Business Management Series (for example, General Ledger, Payroll, Order Entry and Invoicing, A/P, A/R and Inventory). Of greatest importance to many companies are the connections available for the IBM System/36 or System/370, 4300 or 30 series hardware (either MVS or VM) using the Attachment Editions. A virtual disk feature allows the transparent utilization of the disk storage capacity on a host as a PC-fixed disk (up to two 10MB virtual disks active at a time). This feature allows multiple PCs to share common applications and facilitates maintenance and use of the host security and backup procedures.

The other Personal Decision Series products are modular yet integrated, allowing IBM to tailor specific environments for users. This is a good example of the previously discussed approach to micro software and mirrors many common information center configurations. The selection of the data management component as the core of the system seems wise in that the majority of usage is in that area (typically 50% to 95% of all corporate information center usage). Other Personal Decision Series editions include the following:

- Reports — advanced display and application generation.
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Although the IBM offerings fall prey to some drawbacks of inconsistent micro/mainframe packages mentioned earlier, some mitigating factors include an apparently well-thought-out plan for data communications, the modularization of software allowing more function and the fact that IBM is involved. The largest success of these packages should initially be in small- to medium-size business environments, with the communications component enjoying a wider distribution as a utility. The other significant aspect of this offering is the quality and quantity of support provided. An adjunct to the Personal Decisions series is the Extended Support Program, which offers software maintenance, telephone hotline, program updates and a regularly published journal, as well as on-line training options — all designed to help in-house DSC managers.

Even though IBM's software approach does not exactly fit any of the previously discussed categories, IBM clearly has the capability to offer solutions in each of them. The current PC software set addresses the needs of small business and standalone professionals, while partly solving DP requirements involved in corporate micro strategies. By adding a level of data integration with the data base management system activity (similar to Cullinet Software, Inc.) and developing micro versions of the information center products, IBM could provide solutions for any or all standalone, linked micro/mainframe and micro implementations of mainframe software needs. While IBM takes the position of being an "equal-opportunity" software interfacers, a one-stop shopping offering would be a welcome relief to many corporations that find it difficult enough to deal with one software vendor — much less half a dozen!

Because of their flexibility and increasing power, microcomputers have tremendous potential as corporate tools. The software providers that can deliver the best information access and complete integration will be the marketplace winners. Systems now being developed will not only support sophisticated local data analysis on the micro, but will also allow the micro to be used as a "window" through which other files on other systems can be viewed. The ultimate goal of this micro/mainframe integration effort is a system with sufficient intelligence and knowledge to locate and retrieve information, whether it is present locally or resides on a remote computer.

The productivity promises associated with microcomputers, however, will not be instantly or automatically realized. Success

in this area will depend upon management's ability to evaluate long-term requirements and to develop and implement the requisite strategies. There is little doubt that distributed data processing is the wave of the future and the microcomputer is the most appropriate tool for implementation. A basic shift in emphasis in end-user needs has been away from processing logic and toward a shared information

resource. The centralized corporate mainframes will become repositories of large data bases, interdepartmental communications and the extraordinarily demanding processing tasks that require supercomputer capabilities. All the analytic software will eventually reside on the micro level.

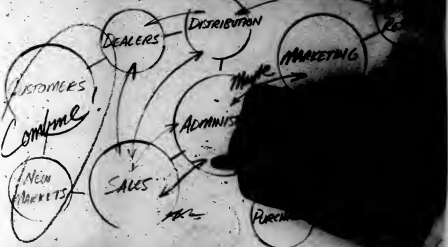
A glance backwards tells us that local processing capabilities, both in terms of hardware

and software, have existed for some time. What has not become available is a uniform, cost-effective method of distributing the data from a central site out to the distributed locations. The vigorous and highly competitive telecommunications arena will undoubtedly lower transmission costs and support greater transmission speeds in the near future and will make an integrated, total solution ap-

proach to personal computing necessary for vendor survival in the corporate marketplace.

Bergstrom is vice-president of marketing and a principal of Real Decision Corp., a research and consulting firm headquartered in Darien, Conn. Crawford is director of data management decisions at Real Decision Corp.

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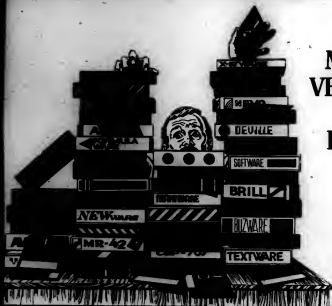
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Developing Software At IBM

By Glenn Rifkin

IBM's entry into the micro software arena may eventually add billions to its already bulging coffers, but Big Blue's motivation is not merely monetary. What IBM is seeking in the volatile personal computer market is control of its own destiny, and software may just be the driving force in that quest.

Make no mistake, the microcomputer software market is tinged with gold — an estimated \$15.4 billion market by 1989, according to International Data Corp. (IDC) — and IBM has yet to be shy about jumping into lucrative waters. Initially, entrance into this new arena may prove to be a strategic one . . . a move to "try and gain more control of its hardware systems sales," according to Michael Killen, president of Strategic, Inc., a California consulting firm.

With an estimated \$4 billion in personal computer sales giving IBM nearly 30% of the market in 1984, it is difficult to comprehend the company's feelings of insecurity. Yet industry analysts (as well as Steven Jobs, cofounder and chairman of Apple Computer, Inc.) are convinced IBM wants more — a great deal more. IBM opened the

architecture and chose Microsoft Corp.'s MS-DOS operating system for the Personal Computer when it was first introduced in 1981. By doing so, IBM spawned a massive and lucrative industry for both PC-compatible hardware vendors and independent third-party software developers.

In order to secure its own continued growth rate of 15% to 20% annually, however, IBM must grab a larger slice of the very market it created, analysts said. The corporation is looking at the PC marketplace as a key contributor to future growth, and PC software development is viewed as a catalyst in that market. "IBM is in the process of taking back much of the compatibles market," Killen said, "and one way to do it is to come out with sophisticated hardware with a lot of hooks that are easily accessible only with IBM software. Software is part of the strategy to start bringing the PC-compatible market back home."

The sophisticated hardware introduced last August took the form of the IBM Personal Computer AT, a powerful multitasker, multitasking machine. At the same time, IBM quietly announced Topview, a windowing software package developed internally at the Boca Raton, Fla., Entry Systems Division (ESD). Topview marked the computer company's Number 1 home-brewed PC software offering. Topview, which has just recently begun shipping, has stirred up tremendous interest among industry consultants and the trade press. The early assessment of the product is that its impact will be volcanic. "It will be a smash success," stated Scott M. Smith, an analyst with the Gartner Group, Inc. "My people think it will be dynamite," Killen said.

On its own, Topview does little for the PC user. It is not an applications package or an operating system; it falls somewhere in between. Topview, in fact, creates an environment in which application packages can be used in a windowing or multitasking mode. Though current IBM PC packages will run under it, they reportedly don't take full advantage of the system.

"Topview is a systems extension product," explained IBM's Bob Markell, vice-president of software and communications products for ESD. "In large systems terms, it's kind of like a subsystem." By creating this environment, IBM has set the groundwork for building a neat little fence around its PCs. Though Markell insisted that Topview "is as open as any other product we've released," analysts believe it could either lead to a proprietary operating environment for IBM or at least separate the end user from the architecture of the PC, so IBM could be free to change the hardware — to move away from MS-DOS, for example.

Markell dismissed most of the theories about the long-term intent of Topview. He pointed out that IBM is looking for ways to increase productivity on its systems, and Topview provides three essential elements — multitasking, simple user interface and windowing. He emphatically denied IBM is using Topview as the weapon in a battle to close off third-party developers. "The open architecture has been one of the key success stories of the PC," Markell stated. "We have absolutely no intention of changing

To secure its own continued growth rate, IBM must grab a larger slice of the very market it created. It is looking at the PC marketplace as a key contributor to future growth, and PC software development is viewed as a catalyst in that market.

that. The fact that people will take advantage of the software products by being able to exploit their capabilities provides

us with a greater opportunity than could be gotten with a closed system."

Markell pointed out that IBM, in fact,

has taken steps with Topview to ensure continued access by outside developers. The company introduced the Topview Programmer's Toolkit, which aids in developing applications for Topview, for \$395. "It is extensive documentation of everything that Topview does," Markell declared. He also recalled that on the day Topview was introduced, IBM held a seminar with Topview's developers on hand to answer third-party vendors' questions. These seminars have continued on a regular basis, he added.

"If other products want to take advantage of the things we're doing, that can do nothing but help," Markell declared.

Though Topview doesn't close off outside development, it does provide a creative way for IBM to gain more control over its own future product offerings.

For project management, first you went to Harvard.



according to Smith. "People want to be able to plug applications into an operating environment, so Topview is a good idea," Smith explained. "But IBM is trying to separate the user from the architecture of the machine, so that if they want to change the hardware it will remain transparent to the user. IBM doesn't have that control now, but Topview will give it to them."

This argument fuels speculation that IBM is itching to move away from the PC-DOS environment into new avenues without leaving its vast DOS base out in the cold. The company's announcement of PC-Xenix, a Unix-type operating system for the PC AT, for example, brought

"IBM is trying to separate the user from the architecture of the machine, so that if they want to change the hardware it will remain transparent to the user. IBM doesn't have that control now, but Topview will give it to them."

on an avalanche of conjecture. Again, Markell insisted that such was not the case.

"Our intent [with PC Xenix] was to provide good products for people who want to move into the Unix environ-

ment," he explained. "DOS remains a major part of the installed base for the PC and I would expect it to continue growing and being extended over time in substantial ways. There's a long laundry list of requirements that, quite frankly, we need to get solved as soon as possible to let that environment keep growing."

"But it shouldn't be looked at in any way, shape or form as a reduced commitment to the DOS environment. We'd be crazy if we did that," Markell said.

The Directory, IBM's internally developed PC software, marks IBM's jump into the home, education and small business markets. The 36 low-priced application programs that form this group are separated into four categories: entertainment, education, productivity and business. The Directory is aimed at PCjr and stand-alone PC users, and the programs are available individually, in special value packages, or as a total package for \$865.95. An IBM spokesman indicated that The Directory would be published three times annually with additional programs included.

It is ironic that the first actual PC software programs introduced by IBM for the large corporate setting have added more confusion: neither reportedly runs particularly well under Topview. The two packages of modularly designed applications are the Personal Decision Series (PDS) and the Business Management Series (BMS).

The PDS consists of six separate applications — Data, Words, Graphs, Plans, Plans Plus and Reports — which range in price from \$150 to \$300. According to a bulletin from IDC, information may be shared between the modules through the package's Data Edition in order to form compound documents.

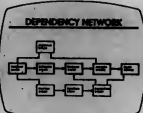
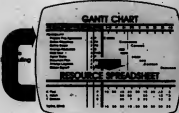
BMS is made up of six accounting packages that cost \$695 each; like PDS, each module may be used separately or as part of an integrated system. Though both PDS and BMS were developed internally, neither is new. The packages were both originally written years ago for larger IBM systems and reconfigured for the PC. Analysts point out that one reason the packages are not fully compatible with Topview is that they were developed by IBM's Information Systems Group, while Topview came from ESSO.

Industry watchers consider the packages simply average "ho-hum" fare, which in IBM's case is usually adequate. That may suffice with PC software in the long run as well, but for now it isn't enough, Smith said. "Users are not running out to buy the software. The greatest chance of success will be with the BMS accounting products. In the PDS area, IBM has to contend with Lotus and it's got its work cut out for it there. The IBM name doesn't do much for them in software."

Barbara Ingar, president of ISI Consulting, Inc. in New York, agreed. "The major market share of IBM's software will be analogous to the number of PCs sold through IBM's National Accounts Division. People buying through retail channels will buy Lotus 1-2-3 and other packages that are accepted standards," she conjectured.

An IDC report on the packages pointed out that quality was not necessarily the issue. "It is important to note that the introduction of these programs should be seen as an attempt by IBM to

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tents to increase revenue rather than as a mainstream IBM move to displace the third-party software market. None of the PDS or BMS packages offer any significant advantages over currently available third-party packages," the report stated.

Smith added that IBM's greatest success may be in the small business area, using the accounting software as a lead-in.

Nonetheless, Markell acknowledged that IBM fully intends to bring a great deal of its large-system software down to the PC level; he gave as an example Displaywrite 2, the word processing software taken from the company's successful Displaywriter workstation. "We have

IBM is actually beginning the arduous task of tying together its large, diverse and incompatible product line, using the Personal Computer and Personal Computer software to drive that maneuver.

a lot of attractive software in IBM, and we should do everything possible to make that software available to our users."

Markell said. "You have to realize, however, that if they are not good products, they won't sell. What we are trying to fo-

cus on are products that have had a very positive reception with the user community. Where we provide consistency with the really good products throughout our line, it will do nothing but enhance IBM and the PC."

Smith of the Gartner Group disagreed with IBM's philosophy and said that bringing mainframe software down to the PC level was a big mistake. "It's a whole different ball game on the PC level," Smith insisted. "It's a different methodology and different user. To take an outdated program and try to squeeze it onto a machine for a novice user is a mistake. Certainly they have the people and money to build new software from scratch."

As it gropes and feels its way into this new arena, IBM is actually beginning the arduous task of tying together its large, diverse and incompatible product line, using the PC and PC software to drive that maneuver. "IBM is trying to move people upward," Insur said. "They want the links and bridges to be as widespread as possible."

In that vein, IBM announced its Host Attachment programs, which reportedly extend the communications of the PDS modules to System/36, 370, 4300 and 308X hosts. These links consist of software running on the PC, on the host, and a terminal emulation card for the PC. The Attachment software will allow users to download and upload host files, run host applications in terminal mode and store PC-DOS files on the host as a virtual disk.

In the second quarter of this year, IBM is scheduled to deliver a new release of the Displaywrite PC software, Displaywrite 3 (which should signal the end of the Displaywriter) and to extend the Displaywrite WP architecture to the System/36 with Displaywrite/36. Consultants agree that IBM is setting up its office strategy using System/36 as a departmental host, with PCs as the desktop workstations.

"In the cases where we have good products, it just makes sense to make them available in the whole realm, especially for people setting up networks where they may switch from a PC to an intermediate node to a host system," Markell stated. "It would be nice if they didn't have to relearn every product they are using." Tying everything together will be no easy task. "It's going to be a long struggle," Smith declared. "Their software architecture is so diverse that they can only patch things onto the front end, which is what they are doing."

However its long-range plans finally conclude, IBM is keeping a benevolent profile at present. Markell insisted the company intends to rely on both internal software development and independent software manufacturers to supply "the functions that people seem to need, want or would find useful with the PC environment." He admitted that IBM would try to "optimize revenues" in that area, but added "the variety of software opportunities still out there is staggering."

Markell indicated the independent software community has not responded negatively to IBM's intrusion into its territory. "We've tried to be very open with them. In the case of Topview, we gave them information that will let them take advantage of new opportunities and be effective competitors with us," he stated.

Riffin is update editor for Computerworld.

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Avoiding The Pitfalls in Developing Customized Micro Software

By John O. Saunders
And Naomi Karten

One common misconception concerning the microcomputer is that it is best used as an organization person's personal tool. The user was to take full responsibility for the micro, and MIS managers had only to concern themselves with providing secure access to the corporate data base in order to support user activities.

With recent changes in the capacity of micro hardware, this view of the micro has become out-of-date. Micros are now appropriate foundations for both personal uses and customized applications. Failure to recognize this new role of the micro as a part of the organizational information architecture can lead to several problems for both the systems that are developed and the organizations that develop them.

Certainly the view of micros as

personal tools was appropriate in the early stages of their use. The original Apple Computer, Inc. Apple II's and Tandy Corp. TRS-80s were indeed personal computers in many senses. They offered relatively limited main memory capacity, floppy disk-based data storage, limited instruction sets and modest processing speeds. They were good for dedication to one task at a time that required user interaction. The early equipment, however, was not appropriate for transaction processing and multitasking production requirements of applications that ran on mainframes and minicomputers.

Micros have become identified with the notion of end-user computing, in which users are given powerful computing tools to apply to their needs as they see fit. The organization usually provides ad-

vice on the use of these tools, but the general assumption is that users will be able to solve many of their specific information needs on their own.

Unfortunately, in encouraging users to apply micros to their information needs, companies often do not make the critical distinction between organizational and personal information systems. Perhaps because micros have been so strongly associated with generic, end-user packages for word processing, spreadsheets and list management, corporate managers have assumed that users could not wander into the organizational systems territory. Consider the following cases:

- An article in a recent issue of the *Wall Street Journal* mentions a Dallas-based oil and gas company that fired several executives

who made decisions that led to losses of several million dollars. The errors were caused by faulty calculations embedded in a microcomputer spreadsheet model.

- A credit analyst in a major East Coast bank spent several months developing a system using a spreadsheet package. The analyst intended the system to follow the bank's credit analysis guidelines so that it could be used by other loan officers. However, after developing 80% of the system by trial and error, the analyst found the model became so complicated, it could not easily be completed or extended.

- A large commercial bank used a summer intern to develop an IBM Personal Computer-based system for a portion of its trust operation. After one year, the business had grown substantially.

However, the system was designed in a manner that did not permit extension of its functions or transference to more powerful hardware. Thus, the bank had to decide whether to forgo further growth in the business or develop an entirely new system to meet the increase in demand.

All these stories have aspects that are familiar to DP professionals in the context of mainframe- and minicomputer-based systems. The image of either a critical system crippled by a subtle bug or a development project run amok, without any design or plan to guide it, are the basis for many DP war stories. Yet, in the examples noted above, we find systems developed by users for microcomputers, not by teams of programmers to run on a mainframe.

The consequence of faulty design or of poor planning can be just as devastating to such efforts as they are to larger projects.

Microcomputer hardware and software are now sufficiently powerful to support fully customized systems to meet organizational needs. Current microprocessors, such as the one used in the IBM Personal Computer AT, are as much as five times as powerful as the processor at the heart of the Apple II. The memory capacity, instruction set, on-line storage and memory management techniques are just as powerful in the next generation of micros as those of minicomputers several years ago.

Users are becoming aware of this enormous capacity and have gotten ahead of their management information systems organizations by building their own micro-based systems. Particularly in banking and financial industries, ambitious managers see micros as an excellent opportunity to get around the DP backlog and build systems to support some new product or service that they can completely control.

However, as the examples cited above indicate, relying on customized micro-based systems to meet organizational requirements can be a source of difficulty as well as opportunity. Most difficulties arise because of failure to recognize that a particular system serves the needs of the organization rather than an individual.

This distinction can be subtle. For example, was the spreadsheet model mentioned in the *Wall Street Journal* article intended for the personal use of the executives making the decision or for all executives making a similar decision? If the former, then the spreadsheet model was a personal information system; if the latter, it was an organizational information system.

The deciding factor has nothing to do with the hardware or the software used, or even with whether the system is computer-based. The distinction rests on the dependence of other parts of the company on the system's output. The fundamental test is whether, after a sudden failure of the system, individuals or groups within the firm would be impaired from performing responsibilities. By this criterion, it is clear that many micro-based systems have organizational implications.

The misperception of a micro-based

Many micro-based systems have organizational implications. The fundamental test is whether, after a sudden failure of the system, individuals or groups within the firm would be impaired from performing responsibilities.

system as personal rather than organizational leads to a number of project-oriented problems and organizational risks. Among the project-oriented problems

likely to occur are the following:

- Inappropriate and insufficient resources are applied to the project.

The ease of purchasing micro hardware and the extremely low cost and ease of use of micro software have contributed to an attitude that micro applications are not very important. The result is that projects intended to operate on a micro are perceived as noncritical. As a result, staff with neither the time nor the experience to design and develop a system properly are assigned to the task.

A system may result from this effort and, with luck, it will operate satisfactorily. But the system will rest on a design that cannot be easily changed and will probably not be tested thoroughly or include documentation that would make it useful to others.

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Unfortunately, some companies have actually institutionalized this approach by deeming that the professional system development staff will not become involved in micro-based projects. Many information centers rigidly follow the guidelines first disseminated by IBM that the information center should not develop applications for users. Such an attitude forces users to turn to user-oriented software products, such as Ashton-Tate's Dbase III, and whatever expertise they can acquire from outside the firm to develop legitimate systems.

• Inappropriate development tools are relied on for building the system. Most advertising for microcomputer software quite properly promotes its ease of use as well as sophistication. However, the over-

Many information centers rigidly follow the guidelines first disseminated by IBM that centers should not develop applications for users. This attitude forces users to turn to user-oriented software products.

all effect of this promotion is to suggest that just about anything one needs to do in a business environment can be accomplished with a generic list management

package or an electronic spreadsheet. Users who are frustrated with waiting two months to get results from the data processing department are only too eager to accept this idea. As a result, users are often tempted to rely on a user-oriented package for developing a system that must meet much more sophisticated sets of requirements. Appropriate tools for these more sophisticated systems include high-level programming languages such as C and Pascal, powerful operating systems such as Unix and truly relational data base systems.

• An inappropriate development cycle is chosen (or not chosen) for a given project. Much recent research has shown that two generalized approaches exist for systems development — the traditional life cycle approach and an iterative design

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and development approach. The life cycle approach has been the standard methodology for large, complex systems based on mainframes and minicomputers, while iterative design and development methods have been used for decision support systems and smaller, end-user-oriented systems. Both development cycles are appropriate for micro-based systems depending on the complexity, criticality and organizational exposure of the system.

Unfortunately, managers rarely give explicit consideration to the proper development cycle to be used for projects. Nonetheless, this consideration is particularly important for micro-based systems because micros can be applied to systems for which either development methodology is appropriate. Thus, managers often make an implicit decision to follow an it-

Unfortunately, managers rarely give explicit consideration to the proper development cycle to be used for projects. This consideration is particularly important for micro-based systems.

erative design/development approach when it is not fully appropriate. But as

the third example cited above demonstrates, many micro systems are critical

enough to require a life-cycle approach to their development.

In addition to these project-oriented risks, developing customized micro-based systems also poses several risks to the organization. The most important danger is that the organization, in deciding to develop such systems, will choose to give up control over the process. Such lack of control can open the way for all the project-oriented risks already mentioned.

Other organizational risks include the following:

- The absence of corporate controls and lack of reconciliation of micro-generated output with other organizational systems can lead to management-based decision making based on erroneous data. Centralized systems, while monolithic, at least provide the opportunity for reconciling all similar data across different applications.

- The absence of control or even knowledge of who is developing what applications can lead to a proliferation of both data and applications. Managers increasingly voice concern over appearing at a meeting armed with spreadsheet output only to find other managers with other spreadsheets and different results. Similarly, large organizations may find that different divisions are developing the same micro-based application at the same time but with no coordination of effort.

Thus, major corporations will soon find that they are, willingly or unwillingly, developing customized micro-based systems. In order to cope with the process, therefore, firms must take the following steps:

- Recognize the distinction between organizational and personal uses for micros. Develop guidelines that will help users understand the distinction, and develop policies for assisting users who can demonstrate a need for a micro-based system.

- Develop guidelines that can distinguish those applications that are best suited to mainframes and those best suited to microcomputers.

- Seek out opportunities for successful micro-based systems. Use such opportunities as a means of demonstrating the value of such systems and the value of using the proper design/development approach and development tools.

- Develop guidelines for the choice of development, methodology, documentation standards and accountability for micro-based systems that are organizational in nature. Establish guidelines that will ensure a uniform approach to application design and development.

Specialized applications built around microcomputers can allow firms to enter new product areas, increase operational effectiveness and compete more effectively. However, it is necessary for firms to understand the special circumstances imposed by microcomputers in order to exploit these opportunities fully.

Stauders is a principal with the Boston Systems Group, Inc. He recently managed the development of a decentralized management system for a large university. Kartan is president of Kartan Associates in Randolph, Mass., and an associate of the Boston Systems Group.

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Data Security — You Can't Work Without It

By Lee White

In August 1983, an alert computer operator at Memorial Sloan-Kettering Cancer Center in New York City became aware of unauthorized activity on one of the hospital's computers. He watched as inquiries were made into a part of the system involving radiation therapy treatment and sent a message requesting that the hacker stop playing around. No harm was done to the system. In fact, the particular machine and the program it was running had nothing to do with the actual treatment of patients, although the program was shared by many other institutions and was used to determine appropriate calculations for radiation dosages.

The trespassers were a group of Milwaukee hackers who came to be known as the 414s (the area code for Milwaukee), and they

were busy that week. In addition to invading the hospital's computer, they also entered systems in a U.S. nuclear weapons research center in Los Alamos, N.M., a West Coast bank and the Milwaukee School of Engineering. The 414s did delete some student records from the school but did not damage the other systems.

Just how difficult is it to break into a mainframe? Not very, according to good guy and bad guy sources, all of whom chose to remain anonymous. As microcomputer software becomes more integrated and multifunctional, emulation software (software that enables a microcomputer to look like a mainframe terminal) hasn't changed at all.

For the price of a modem comes the ability to access other microcomputers and mainframes, often

without even incurring the cost of a long-distance phone call. (See Q&A, Page 5.)

Some programming knowledge is necessary if invasion is the game the hacker plays. According to one source, it would take a good programmer about one hour to write a program to instruct the computer to keep trying until a system is reached. A novice would have trouble, he continued, because he has to control the dialing functions of a modem. But, he added, anyone with experience sending commands out to a communications port like a modem would have very little difficulty.

It can be much easier. One hacker said, "Some [electronic] bulletin boards have programs on them that you can take for free. The only thing is, you don't claim that you wrote it. You can take it,

you can use it, you can give it to anybody you want; you just let the person who wrote it take credit for it. As a matter of fact, I picked up one called the War Games Number Disser."

Outside hacking is considered a major annoyance, but is not regarded as seriously as the problem of the disgruntled computer-literate employee or ex-employee who can easily sabotage the company's mainframe.

The threat of internal sabotage is very real, and organizations are too often unaware of the danger until it's too late. In Los Angeles recently, two "logic bomb" programs were set in the two computers of Collins Foods International, Inc. The first was designed to destroy software and data, but would not go off without outside prompting. The second would

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erase data files and the software necessary to restart the computer. Two former employees were charged with conspiracy to commit computer fraud under California's recently enacted computer crime law. The two men, now employed as programmers at other companies, await trial.

In another California case: a former employee of Micro Porcelain Dental Laboratories, Inc. in Dublin planted a logic bomb in his company's computer to collect vacation pay he felt he was owed. The company paid, the machine was restarted and the employee was arrested and sentenced to 36 months' probation.

A close relative of the logic bomb is the "Trojan horse," so named because its harmless exterior hides a sinister purpose. This program will perform an expected function but also leave the system wide open; at a later time, the hacker can reenter the machine undetected.

Just what are organizations doing to protect themselves? Those that have been invaded by hackers or angry employees have increased security in order to stay a few steps ahead. A representative of the Memorial Sloan-Kettering Cancer Center, which the 414s targeted two years ago, said adjustments have been made to ensure that it would be "more difficult for them, very difficult, to tap into." The spokeswoman declined to give further information, saying that "once you start encouraging, people say, 'Well, let's see if we can do it.'"

An executive of the Security Pacific Bank, which was also tapped by the 414s in 1983, has had no further problems, internal or otherwise, and doesn't anticipate any. "We recognized what was happening with the 414s, we tracked it to only test data and eventually turned the data over to the FBI," he said.

The bank is continuing to monitor its security precautions. The DP department had its own internal system security group that was involved with software integrity. That group is now under the larger umbrella of corporate security. The group is implementing a software program that will look at some critical data bases. A DP executive explained: "We're putting through a user exit in the IBM software in our on-line time-sharing system. [This software] can block any access, even though there is a valid ID and password, if it's coming from an unexpected location. And we allow only a handful of people, on an extremely limited basis, access to our production systems. Those people are known by name. When they call into the computer center, the center calls them back and patches the connection, so it's been voice authenticated. The connection is made outbound after their phone call." He also mentioned a software security program product put out by IBM called Resource Access Control Facility (RACF) that presently runs under MVS. He expects IBM will have RACF available for VM within a year, at which time the bank will probably put it on its computer.

But such careful security measures can be very restrictive. It is possible to restrict access by ID, password and terminal address, but that level of security would make it impossible for an employee to walk across the hall and access the mainframe from a co-worker's terminal.

A simpler method, which is not applied very often, is the frequent changing of passwords. At California's Security Pa-

cific Bank, passwords lapse after 90 days. Larry Dorf, senior vice-president, said this is a painless way to keep on top of problems. "Every time you beef up security procedures somebody gets annoyed because it interferes with his work habits. But frequent changing of passwords is a technique that we've gone to. First you get a warning, and then it lapses." If an employee at Security disregards the warning, he has to go through the procedure of requesting a new password, which can take a day or two. Dorf said very few people let passwords lapse.

Another method of security that could be more widely used is the U.S. Data Encryption Standard (DES) algorithm. Developed by the National Bureau of Standards, it is used in all automated teller machines (ATMs). When the card is inserted

and the personal identification number is punched in, the message goes from the ATM across the communications line to the computer. The computer decrypts the envelope of the communications message, revealing the personal identification number, also encrypted. It then goes to the file record of the account balance and pulls it up; in that record, there is an encrypted version of the personal identification number. The two encrypted versions have to match in order for the cash to be issued. According to banking sources, a customer's personal identification number is not written down in any location, so that even bank employees are not privy to this information.

Although encryption techniques provide good security, even two layers of encryption may not be as foolproof as sys-

tems executives might wish. "It is helpful for security, but it's still not unbreakable," said one hacker. "It is getting more difficult. But if you're clever enough, you can figure out the one pattern that will decode it all, because if you think about it, two patterns added together to make one file has to somehow have one pattern."

Keeping large computer systems secure from access by unauthorized users is only one of the problems that worry organizational executives. Another takes the form of floppy disks on which sensitive data may be stored. "Corporate executives are finding that the proliferation of microcomputers has meant that really important, critical, competitively desirable information is allowed to kick around everywhere on floppy disks without any sort of protection,

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without any sort of security," said Kenneth Bosomworth, president of International Resource Development, Inc. (IRD), a market research firm in Norwalk, Conn. According to IRD, corporations are now finding that locks on doors of the mainframe computer room, security checks and lie detector tests for DP employees and sophisticated data encryption boxes to protect against tapping transmissions may not be enough.

"After the vice-president of corporate planning sets up his program and, out of his own head or out of papers in his own file cabinet, punches in the company's plans for the next five or 10 years," continued Bosomworth, "he might leave those floppy disks on his tables and around his office, unguarded over the weekend. Of course, he probably locks

his file cabinet up very carefully for the weekend, but he still leaves floppy disks with all his corporate plans lying unguarded on his desk."

Although many companies disregard the dangers of randomly placed floppy disks, Security Pacific has taken positive steps to ensure the safety of sensitive company data that is stored on microcomputer diskettes. One of the departments for which Larry Dorf has direct responsibility is the information center, and he chairs an information center steering committee that includes a number of bank executives. Members of another committee, the DP security committee, have written a manual that takes into account all kinds

of security issues, including micros.

"The cornerstone of what we're trying to get at is defining accountabilities, defining the fact that security is everybody's responsibility. We're going to help them implement the policies and practices through guidelines and do's and don'ts, but they're really the owners," Dorf said.

Microcomputer data integrity is easy to control and inexpensive to implement, according to the corporate executives contacted. In contrast, system integrity is costly, time-consuming and possibly not worth pursuing. Most DP managers said implementing security measures strong enough to repel unauthorized access would also make life very difficult for authorized users. "Sooner or later," said Dorf, "the law of diminishing returns

comes into play."

Perhaps one answer to the problem of unauthorized access to data bases via micros lies not in trying to keep hackers completely out of computer systems, which the experts on both sides of the fence say just can't be done, but to make critical files as inaccessible as possible. Another possibility, suggested Wayne Cerow, president of Cerow Investigations and Consultants in Phoenix, Ariz., is the presence of monitors on computers that would alert staff members or security personnel to ill system entry attempts.

Cerow also stated that hackers should be punished. Although most are juveniles, he said, states should change statutes, and hackers' home computers should at least be confiscated. "Maybe they should be made to do some sort of civic duty, but they shouldn't be made into heroes. They should know that it is against the law, it is a crime," he said.

Some of the youthful hackers have seen the errors of their ways, or maybe they've just seen a way to avoid prosecution. In Minneapolis, a 15-year-old youth who last year was caught tapping into a bank's computer has aided police in breaking the computer code of a suspected sex offender. It took the youth 45 minutes to break a system that had confused police for nearly a month. And in Columbia, Md., a 13-year-old agreed to help authorities solve instances of computer crime after he himself had been arrested for computer card fraud. It is interesting to note that the bank traced the telephone call of the Minneapolis boy, but the Maryland youth was caught after an informant spoke to the police.

Adult hackers are not faring as well as their youthful counterparts. Computer crime laws are now on the books in 33 states. Stanley Shynstad of Thurston County, Wash., entered the State of Washington's computer system and had the state mail him checks totaling \$17,000. Shynstad kept none of the money, giving it instead to needy friends. His contention that he was a modern Robin Hood did not impress the judge. He was sentenced to 10 years in prison, but was paroled after 14 months. Another computer criminal in Arizona spent 30 days in jail and is now on probation.

One of the major problems security enforcement is up against is the unwillingness of many organizations to make public and therefore prosecute those who have illegally tampered with data. Although this situation is changing, many organizations are unwilling to risk public exposure of their data's vulnerability.

On a closing note, what ever happened to the 414s? According to the youths' attorney, Paul Piskoski of Milwaukee, Neal Piskoski was granted immunity for cooperating with authorities, and two or three of the others were charged with misdemeanor offenses and fined \$500. A computer crime law existed in Wisconsin at the time but, according to Piskoski, the break-ins were interstate rather than intrastate, "at least the ones that [authorities] were aware of."

Perhaps it's just as well that the 414s didn't serve any time in prison. An ex-convict who was charged under the State of Arizona's computer crime law was sentenced to 15 years in jail. Wayne Cerow said the ex-convict had previously learned to use a computer in jail.

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White is senior writer at Computer World Focus.



Integrated Software — Past, Present And Future

By Morton Rosenthal

When Lotus Development Corp.'s Symphony and Ashton-Tate's Framework were introduced in July, most computer users expected them to be the ultimate in integrated packages.

Symphony, with its super spreadsheet, was supposed to be geared for the numbers-oriented user. Framework, with its outline capability, appeared to be ideal for the word-oriented person. Between the two, the market seemed to be covered. That's not quite the way things worked out.

Symphony turned out to be a little different from what was expected. Although Symphony does have a first-rate spreadsheet, it also has a major deficiency — all its other functions are based on the spreadsheet model. That's o.k. for a user whose world revolves around the spreadsheet, but it

makes things rather tedious for other users whose word processing or data base needs have nothing to do with spreadsheets. And, in many cases, even spreadsheet experts find Symphony difficult to use.

Framework turned out to be a better balanced package than Symphony — and it even has a powerful spreadsheet. As is the case with Symphony, however, Framework's other functions can't compare to a collection of good stand-alone programs. Framework is easier to learn than Symphony is (unless you're already an expert at Lotus' 1-2-3), but it can be a challenge for someone who's never used a computer.

The game didn't end with the introduction of Symphony and Framework. In the last several months, a host of new integrated

packages have appeared on the market. Some meet a need Symphony and Framework didn't fill; others don't seem to occupy any niche at all. Users who found the choice between Symphony and Framework tough now realize that selecting an integrated package can be as difficult as deciding what to order at a Chinese restaurant.

Five packages will be discussed here — Symphony, Framework, Enable (Alpha Software Corp.), Smart Software Series (Smart Software) and Electric Desk (The Software Group, Inc.). They are, in the judgment of Corporate Software, which annually reviews many packages for sale to its customers, the best available integrated products for corporate use.

Symphony — Symphony is an excellent spreadsheet, but its oth-

er functions are essentially add-ons. Because its functions are based on the spreadsheet model, nonspreadsheet tasks must conform to spreadsheet conventions. In the word processor, for example, blocks of text are moved as though they were cells in a spreadsheet. Because of Symphony's spreadsheet orientation, relatively simple integrated functions — such as merging data variables into a WP document — can be somewhat complicated.

On the other hand, if you enjoy keeping your calendar or maintaining your customer mailing list in a spreadsheet format, you'll feel comfortable with Symphony. It's great for 1-2-3 users who already have their spreadsheets jumping through hoops; it allows them to jump through higher and more difficult hoops.

Symphony is not for computer novices, however. It has several levels of menus that can be confusing even for veteran 1-2-3 users. In fact, of the five packages selected, Symphony was the toughest to learn. Ironically, it's also the most popular.

Framework — Framework is the best product of the five for integrating information into a single document or display. Because the program stores its information in frames (that can be easily assembled in any order desired, it's excellent for integrating text, numbers and graphs into a finished report.

Although Framework isn't as similar to 1-2-3 as Symphony is, users of 1-2-3 will have no trouble making the transition to Framework. The package has a powerful spreadsheet, and it comes with

a special start-up manual for 1-2-3 users. Framework even has a spreadsheet feature not found in Symphony — it allows consolidation of information from multiple spreadsheets into a single spreadsheet.

Unlike Symphony, Framework has an independent word processor and a real file manager, not add-ons that are extensions of its spreadsheet. In other words, you can easily use the word processor to draft documents that have nothing to do with a spreadsheet.

Furthermore, you don't have to worry about storing all your data in one large spreadsheet when you're running Framework, because the program makes your data manageable by breaking it into smaller units or frames. It's the difference between writing a report on one huge

sheet of paper vs. placing it together from several normal size sheets.

Another special feature of Framework is Fred, its built-in programming language. You will really be able to appreciate the power of Framework when you learn to use Fred commands as you work within the program. (You can start off using a few essential commands, then graduate to additional ones as your confidence builds.) Fred is also useful as a procedural language with which you can program a turnkey application system.

Framework is good for beginners because the menus and commands are consistent across all modules and are designed to make the program easy to operate as well as easy to learn.

Enable — The most capable all-around program is Enable. It is as power-

ful as a collection of stand-alone programs, and it offers the benefits of integration to boot. What's more, it runs in only 192K bytes of memory.

Especially noteworthy is Enable's spreadsheet, a fast, reverse-engineered version of 1-2-3. The menus, keystrokes and functions of the two spreadsheets are virtually identical. Also impressive are Enable's data base manager, which is fully relational; its word processor, which is by far the best word processor available in an integrated package; and its graphics component, which produces presentation-quality graphs and even has a three-dimensional feature.

At first, beginning personal computer users will find this program tougher to learn than Framework is; but after the basics are mastered, the advanced features will come relatively easily.

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Users are finding that selecting an integrated package can be as difficult as deciding what to order at a Chinese restaurant.

anyone who needs top performance in two or more areas. It's an attractive alternative to multiple stand-alone programs because its similarity of commands across functions makes it easier to learn and use. It's also less expensive than buying multiple programs.

Smart Software Series — The Smart Series has several confidence levels that make it easy for beginners to learn the package. As users progress, they move up through the levels to get increasingly more power out of the software.

At its top level, however, this package offers less than either Enable or a collection of stand-alone programs. It is not recommended for anyone planning to be a power user in any area.

Relative to Framework, the Smart Series has better data base capabilities, but is less desirable for financial work. It is the most expensive of the five packages.

Electric Desk — The least powerful of the five packages is Electric Desk. All its functions have significant limitations. For example, Electric Desk's spreadsheet is limited to 255 rows by 255 columns, and a WP document can be no longer than 16 pages. Although these limitations may make the program unacceptable to advanced users, beginners won't notice the lack of sophistication.

Instead, beginners will notice Electric Desk's simplicity. Of the five integrated packages, Electric Desk is the easiest to learn. Budget-minded buyers will also notice the program's price, which is the lowest of the five.

This product is recommended for new personal computer users who want to perform a variety of computer tasks but don't aspire to sophistication in any area. It's also good as a starter package for new users who plan to graduate to a stand-alone program in their primary

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area but continue to use the integrated package for other, less demanding needs. For example, a secretary might use Electric Desk as an introduction to personal computing. After becoming comfortable with the program, the secretary could switch to a stand-alone word processor for preparing documents but continue to use Electric Desk for maintaining mailing lists.

Integrated software may be popular today, but what are its prospects for the future? Will it replace stand-alone programs, or will it be replaced by increasingly specialized packages? How will it be affected by windowing software, such as IBM's Topview and Microsoft Corp.'s Windows?

Two schools of thought exist: One says integrated programs are the wave of the future because they are so much more convenient than a collection of stand-alone programs. There is only one set of commands to learn, data flows easily among applications and it's simple to switch from one application to another. Furthermore, integrated packages are generally less expensive than multiple dedicated programs.

The other school says integrated packages are too general for most users' needs. They don't let you pick and choose programs that are optimum for your particular applications — especially when your needs are highly specialized. Moreover, the forthcoming windowing software will allow you to integrate your stand-alone programs so that you'll realize many of the advantages of integration without sacrificing the functionality your specialized applications require.

It's too soon to tell which school will prevail. We tend to lean toward the dominance of stand-alone programs among serious personal computer users. If today's software shoppers think it's difficult to find the right program for a particular need, what are their chances of finding an integrated package with just the right combination of benefits to meet all their needs? A professional project planner, for example, may need a complex project management program combined with simple word processor and a presentation-quality graphics program that handles Gantt charts. Does such a package exist? Is one likely to be developed?

Integrated programs like Symphony will survive among the power users because its programs meet a specialized need, not because of the convenience they provide. Symphony, for example, is popular not so much because it's an integrated product, but because it's an excellent spreadsheet.

On the other hand, we think integrated software will survive as the product of choice for nonsophisticated users with nonspecialized requirements. Such users need personal computer software for relatively simple tasks such as cranking out a short memo or an uncomplicated chart. They value the convenience of an all-in-one program over the sophistication offered by a collection of stand-alone programs. The availability of windowing software will not change their minds, because such software will never make stand-alone products as easy to use as the better integrated packages.

In other words, programs like Electric Desk will be around for a while because they provide computer novices with easier access to a variety of functions than they could get from struggling with a se-

One school of thought says integrated programs are the wave of the future because they are much more convenient than a collection of stand-alone programs. The other school says they are too general for most users' needs.

ries of separate products.

Whether integrated products will be more popular than stand-alone products depends on how personal computers are

ultimately used. If power users greatly outnumber convenience users, stand-alone products will be winners. But if the masses turn out to be more interested in convenience than sophistication, integrated software will likely prevail.

Of course, plenty of room exists for both kinds of products; it's not likely that either type will become extinct any time soon.

Rosenthal is chairman of Corporate Software, Inc., a supplier of personal computer software to large corporations, and headquartered in Canton, Mass. The company also publishes a software guide and monthly newsletter to help its customers select and use personal computer software.

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The Long Climb Toward A Micro-Mainframe Link

By Christopher C. Yalonis
And Anthony Padgett



The micro-mainframe link is a technology in its infancy, waiting to be developed for a needy, confused market. The mainframe, filled with valuable, timely corporate data, lures many corporate micro users who have tasted the power of quick, local micro processing and improved micro productivity.

Micro-mainframe links are far from being complete or ample, although the need for micro-mainframe links has been evident since the first micros began filtering into corporations in the late 1970s. Microcomputers could provide easy local computer power in those ancient days, but they could not compete with a time-sharing terminal for access to the corporate mainframe. Micro users might have had easy-to-use software, but they had difficulty get-

ting the data with which to fill their spreadsheets. They first needed to request printed reports from the data processing department and then manually key the information into the stand-alone micro.

In 1982, a new set of products began to emerge, allowing micros to tap directly into mainframes. Initially, the programs were simple terminal emulation programs. Since then, more complex packages that integrate mainframe data with micro-based spreadsheets have been announced and delivered.

The micro-mainframe link has a long way to go. The gap between micros and mainframes is widened by incompatible data formats, inefficient communications standards and security hazards. In addition, DP managers continue very con-

servatively to guard access to the corporate data base. Finally, even if the micro user successfully gains mainframe access, there is a good chance the mainframe data will be simply too vast and unwieldy to transport back to the micro workplace.

In 1984, a growing number of major software houses and a variety of independent companies announced micro-mainframe links. The majority of these products, however, are still in beta test or have only been recently delivered. Most links have faced little real testing in a production environment, and users have had scant opportunity to evaluate the confusing, albeit dazzling, product array. Products priced at from \$100 to \$100,000 have been called micro-mainframe links.

Much of the present confusion

can be eradicated by defining and segmenting the market.

The micro-mainframe link market can be divided into six segments:

- Terminal emulation software.
- Integrated software links.
- Micro-sized mainframe software.
- Protocol converters.
- Hardware enhancements.
- Enhanced micros.

Terminal emulation is the most widely used means of linking micros and host computers. Special boards or software emulate a terminal specifically designed for the mainframe. IBM-compatible mainframes found in more than three-fourths

of all corporate installations are generally accessed through the IBM 3270-series terminal protocol. By the middle of 1984, there were about 2.5 million terminals of these types in use in the U.S.

Micros can be hardware to a 3270-series controller via products such as the Ima add-in board for the IBM Personal Computer that takes advantage of the 3270's speed and error-correction capabilities. Other products access a remote 3270 controller over asynchronous phone connections.

There are more than 100 communications packages that turn a micro into a dumb terminal. These packages have mostly been used to access commercial data bases, such as Dialog and Dow Jones, and to transfer ASCII text from micro to micro or dedicated word processor.

Leading packages include Crosstalk by Microstuf, Inc., Smartcom II by Hayes Microcomputer Products, Inc. and PC Talk by Freeware. In 1983, several sophisticated variations came to market. One of the first, Visalink, was introduced by Visicorp, Inc. Visalink worked with Visicalc (developed by Software Arts, Inc.) to allow the user to download economic and financial data from Data Resource, Inc.'s data bases over phone lines into Visicalc spreadsheets. Prior to that, data from data bases had to be printed out or saved on a disk, then manually reinput into the Visicalc spreadsheet.

Late 1983 and the first half of 1984 saw other programs that allowed the user to turn the micro into a terminal more easily, download information from public data bases and automatically format the

incoming data for immediate input into spreadsheets or financial analysis programs. Dow Jones data bases, Lotus Development Corp.'s Symphony and Ashton-Tate's communications modules are examples of products in this category. Other terminal emulators with file transfer for use to market such as PC Express from Intelligent Technologies International Corp.

Integrated software links go a step further than terminal emulation. Terminal emulation programs do not allow data files from corporate mainframes to be downloaded to the micro to be manipulated or stored, without requiring the user to interact with the most often intimidating mainframe data base query language. Integrated software links have been recently introduced by several mainframe software vendors.

**Until recently,
micro DBMS
software could not
duplicate
mainframe data
structures.**

These sophisticated programs move files from mainframe applications or data base management systems (DBMS) into familiar micro applications such as Lotus Development Corp.'s 1-2-3, Visicalc, or Ashton-Tate's dBase II.

Part of the program resides on the mainframe and another part in the microcomputer. Users can select information from mainframe data bases and load it directly into spreadsheets or other programs without having to wrestle with difficult data base languages or file transfer commands. A few products allow the user to send the results of the spreadsheet manipulation back to the mainframe, thereby revising the corporate data base.

The first full software link was announced by Management Science America, Inc. in early 1983. Since then, a half dozen other mainframe software vendors have followed with link announcements. Yet only recently have finished link products been shipped. Despite rigorous hype from vendors, most concede that initial orders have been slow, and sales of this specific type of link software were less than \$10 million in 1983. Informatics General Corp.'s DB Answer/Visianswer, McCormack & Dodge Corp.'s Interactive PC Link and Computer Corp. of America's PC/204 are examples of this type of link.

In a sense, integrated software links do not offer micro users the ultimate in data access. Ideally, the most needed data would reside in the microcomputer itself. Until recently, microcomputer DBMS software could not duplicate mainframe data structures. Mainframe DBMS are increasingly using relational formats, in which data structures are defined by a series of tables rather than by individual records. But now several vendors are introducing micro versions of sophisticated



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mainframe packages. Oracle from Oracle Corp. and Mathematica, Inc.'s Ramis II PC are two examples of this type of product.

Products can be segmented further into those with open and those with proprietary architectures. Open architecture links claim to offer micro access to a variety of mainframe DBMS and file structures and offer downloading, often with automatic reformatting, into a number of micro data formats. Packages built in a proprietary architecture, a strategy adopted by many of the established large systems software houses to maintain or enlarge their existing user bases, usually provide access only to data residing in a particular vendor's mainframe software. The products generally allow for downloading directly into the company's micro software or into a limited number of popular micro packages.

Protocol converters allow Ascii terminals and micros to emulate a terminal that is compatible with the host computer's protocol. A protocol converter can make the data stream from a micro look like that of an IBM 3270 or 3279 terminal and associated cluster controllers. This allows communications with an IBM host using Systems Network Architecture (SNA), Synchronous Data Link Control. Four basic approaches to protocol conversion are the following:

• Mounting software on the mainframe.

• Obtaining a micro with a built-in protocol converter like the IBM 3270 PC and 370/XT.

• Using an add-on board that may be inserted into or attached to the microcomputer. Most of the popular add-on boards perform 3270 terminal emulation for the IBM PC. If a number of micros need to be linked to a host or if different brands of micros need communications, then individual boards for each computer are less cost-effective than an external protocol converter.

The break-even point tends to be ap-

proximately three microcomputers at a given site.

• Linking one or more micros, terminals or printers to an external protocol converter. Up to now, this tends to be the choice in most offices where more than one micro is linked to a host.

In the other five micro-mainframe product categories, protocol converters are sometimes built right in. Companies with built-in protocol converters include IBM (with the PC 3270), Avaya Technologies, Inc., Protocol Computers, Inc. and Simware, Inc. At the very beginning of the micro-to-mainframe journey, users must make a fundamental choice: How will they physically connect microcomputers with the mainframe? There are two basic choices.

The first choice, an asynchronous connection, uses a modem attached to ordinary telephone lines. Installation is easy and cost is low. Existing phone lines in the office (or home) environment will generally be sufficient for the task. The main drawback is that asynchronous dial-up links only support transmission speeds of up to 2,400 bit/sec.

The system works as follows: A modem converts binary electric signals on the transmitting end from a terminal or computer into voice frequency signals that can be sent over the public telephone system. The modem on the receiving end converts voice frequency signals transmitted through the telephone system into binary electric signals that are forwarded to a terminal or computer. This process of modulating and demodulating gives the modem its name. Modems are generally categorized according to automation of answering and dialing functions and capacity for storage of dialing information, protocols, features and speed. There are three basic types: stand-alone, stand-alone acoustic and boards that slide into the back of the microcomputer. Two leading modem manufacturers are Hayes Microcomputer Products and Novation, Inc. The second, more complicated, method of making the physical micro-mainframe connection is a synchronous link using a coaxial communications

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board. This method is clearly much faster than a modem but requires a coaxial cable that must be specially installed. In addition, if the user wants to communicate over a distance, leased telephone lines are required. This method of connection should only be considered when a modem connection is just not powerful or fast enough.

Hardware vendors such as IBM, Wang Laboratories, Inc., Hewlett-Packard Co., Digital Equipment Corp. and Apple Computer, Inc. offer boards for their desktop computers.

Several independent vendors offer a variety of products within this category including Intelligent Technologies, DCA, Gateway Microsystems, Inc. and Forte Data Systems Co.

Enhanced microcomputers have built-in micro-mainframe links and were designed to run some of the applications written for mainframes. For example, IBM's 370/XT runs both the VM/CMS mainframe operating system and PC-DOS. It can upload and download data to and from a 370, DEC bulk terminal emulation, file transfer and Ethernet networking communications capabilities into its Microvax 1 Personal Computer. Data General Corp. offers three micros with integrated communications capabilities: the DeskTop Generation models 10SP, 20 and 30. These micros run DG's AOS/VS operating system for the MV series of supermicrocomputers, and they can emulate DG and IBM terminals.

The Bank of America is typical of a

large organization using micro-mainframe links. Its data center in San Francisco has 12 mainframes and 300 micros. Personnel ranging from financial planners to programmers are using terminal emulation and downloading files. But only programmers who are developing software are able to upload data. (This function is still in the test stage.) Company expectations are kept low and cautious, starting with terminal emulation. Another firm using links is Queens Hospital in Honolulu, which houses one IBM 3083 mainframe, 200 terminals and 40 IBM PCs linked to the 3083. Since early 1983, the hospital has used various communications products that allow terminal emulation, downloading and electronic mail. The entire nursing staff uses the link to check staffing schedules, patient

admissions, transfers and discharges. Users have access to selected files and uploading is performed only on request from the DP department.

There are 35,000 mainframes installed in the Fortune 2500. Within that Fortune 2500, there will be an installed base of 2.5 million personal computers by the end of 1985. The need to link personal computers with mainframes is evident. The link products being introduced are not in search of a market. Nonetheless, several forces or developments will hinder link sales.

Most users lack awareness of or skills in using link products. Management information systems departments are reluctant to open up mainframe data bases to a large group of unsophisticated micro users. Most link products lack easy-to-use software that requires a minimal amount of training, installation and maintenance. The absence of communications and operating system standards provides a great deal of confusion among many organizations. Link products have a long sales cycle. Initial link product installations per site are few. Only after careful, cautious, lengthy review of these initial installations will a substantial number of additional installations occur.

The market factors that will spur sales outweigh these impediments. There will be a high penetration of IBM 3270 PCs and 370 XT's into the corporate arena, used for their enhanced communications facilities. Users will see the development of easy micro-like query languages and interfaces for nonprogrammers to access mainframe data bases from micros. The porting of more Unix-based business applications to microcomputers will allow file transfers and common applications to run between micros, minis and mainframes. Middle and upper management are becoming increasingly eager to access mainframe data via personal computers. The market will see the establishment of the IBM PC Network as a standard, and, within three years, an IBM token ring local-area network connecting diverse computers and accessing the X.25 and SNA environments.

Joint development and marketing efforts between mainframe and microcomputer software vendors will produce microcomputer-like marketing, documentation, pricing and user interfaces, as well as mainframe-like sophistication, power and corporate MIS department confidence. Vendors will build comprehensive security features into the link software, and gradual establishment of security and mainframe access policies within corporations will help to resolve MIS and top management security concerns.

Finally, as the link market grows crowded, prices will drop gradually, especially for the personal computer portions of the links. The mainframe portion, as it historically has, will retain price stability.

The micro-mainframe market is heating up and shaping up. While the giant software and hardware companies battle for their share of the lucrative pie, users can expect better solutions, easier-to-use software and lower prices. Customers will be the real winners.



Yalons and Padgett are managing partners of the Jupiter Group, Inc., a market research and consulting firm specializing in the microcomputer industry. The firm is located in Sausalito, Calif.

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Micro Data Bases: The Information Pool

By Jan Duffy
And Ken Matheson

Now that information can be generated and captured fairly easily, an obvious next step is to establish guidelines for information storage and retrieval. Little will be gained from imposing on our electronic files the same disorganization we have imposed on our manual and hard-copy filing systems.

Data base managers — often called data base management systems (DBMS) — permit users to apply predetermined labels to information as it is stored. This process provides an internal directory or index containing descriptions of information as well as clues about the relationships that exist among pieces of information.

Originally designed for the management of information on the mainframes, the DBMS is now considered an essential tool for the frequent and creative personal computer user. Also, many off-the-shelf applications software packages use commercially available DBMS packages as a foundation.

Because the data base manager simplifies the organization of data, including storage and retrieval; manipulation and summarization, it can be one of the most important tools for the microcomputer user. The data base manager permits access to the central store for information as it is required, regardless

of the application for which it is needed. This effectively eliminates the need to input the same information each time it is required for a different application or report. As a result, the margin of error is minimized and time consumed during repetitive inputting is eliminated. Maintenance of data in a central store also facilitates the data management function, encouraging the user to validate accuracy, maintain data in a current status and so on.

However, the issue of data base management is complicated because the user may have to deal with several structures; the two most common are hierarchical and

relational. In a hierarchical data base, each record (an assembly of pieces that combine to make up a set of information relating to a specific item) has a master or parent item that appears in no other set of information (for example, an account number or a particular city). One of the problems, of course, is that in the real world, information rarely organizes itself in such a simple fashion (a specific account number may have locations in several cities). The problem of multiple relevance can be avoided by networking or linking the pieces of the hierarchy. However, it is not easy to change relationships of the links after they

have been identified by the user. Unfortunately, these identifications are often made before the user is fully familiar with the DBMS and its capabilities and are frequently underestimated.

The relational data base, although it may be a heavier user of machine resources, more accurately represents the somewhat unstructured nature of everyday information. Each set of information (record) requires a

unique identifier, which is automatically but transparently attached to each piece of information within the set. The master file can be accessed or queried to extract information that is then used to generate a new set of records, which can be manipulated, stored and so on. The system's biggest advantages are its infinite growth and flexibility in responding to new questions or newly formulated queries used

to produce previously unanticipated reports.

Not all DBMS are simple to use; in fact, quite the opposite is true. Perhaps the most important advice for anyone considering the acquisition of a DBMS is to think through your requirements carefully and systematically, asking questions like those that follow:

- What information do you want to store in your data base.

and where will that information come from?

- What type of reports do you expect to generate from the data?
- What do you expect the output to look like?
- How many records (sets of information) do you anticipate? Does your list of accounts number 1,000 or 10,000?
- Who is going to design and use the system?

Too often, DBMS are purchased when the only piece of information considered is the ultimate application, with little thought given to how the old system works or doesn't work and how the new system might work better.

Not only should a DBMS be able to accept input from the sources the user anticipates using, it should also be sophisticated enough to make raw data readily available in the formats required by the analyst in order to complement tools that are being used.

In many instances, large data bases are operating with sophisticated data base management systems, and microcomputer users in these organizations have identified these data bases as potentially invaluable sources of corporate information to be used as input data for analytical processes. In some cases, access to corporate data bases requires only that selected data be downloaded directly to an application software package (for example, a spreadsheet). This requires real-time access to the mainframe data base and may require repetitive access for subsequent spreadsheets. It may be more convenient for the microcomputer user to access the corporate data base and to download a file or a selected portion of a file to the microcomputer's own DBMS so the selected data is available for local manipulation and reporting. This capability can be particularly beneficial in an organization with a high demand for mainframe time or in situations where the microcomputer is in a remote location and mainframe access involves time charges for data communications.

Some DBMS vendors have recognized the demand for mainframe data base access and the ability to download data to local microcomputers. These vendors have designed both micro DBMS packages and interactive link products to facilitate data sharing between the two computer environments. A microcomputer user can expect fewer problems if data can be transmitted from the mainframe data base to the microcomputer data base without reformatting or going through a data translation. Even when the DBMS for the micro and the hardware and software have been specifically designed to provide the link between the micro and the mainframe, data transfer problems can occur as a result of customized mainframe DBMS.

In most cases, the DBMS is only a facility for the management or custody of the data and is not in itself an analytical tool. Analytical tools that rely on the data stored by the DBMS as the source for business information must be able to extract the

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required pieces of data in a usable format from the DBMS.

Applications software packages have specific methods of storing data and specifications for the format of the data which will be presented to the applications software for its use.

If the DBMS is expected to make data available for an application such as a spreadsheet, the user needs to ensure that the DBMS and the spreadsheet can work together. Application software packages that can directly integrate with the data base

to prevent input of inaccurate data may be needed.

DBMS users generally fall into two types: application designers and developers and application users. In many cases, particularly in the microcomputer environment, the designer is also the user.

It is not always necessary for the user to be able to write the programs required to process the application. The DP depart-

ment usually has staff members who are responsible for translating user requirements into computer programs and, on a smaller scale, the process is the same for the microcomputer. Someone needs to know how to write a program or design a command file that can be used to accomplish the desired result.

Some microcomputer DBMS packages use very sophisticated programming languages and re-

quire a significant level of programming skill; others are very simple and are designed for the user who does not have programming skills. In general, complexity of the application correlates with level of skill required to design an appropriate program.

The ease with which a casual user can operate a data base application depends to a large extent on the intended user group

for which the DBMS was designed and the skills of the person who designs the application.

Duffy is a partner in Duffy and Bentley Consulting Group, office systems consultants, and is the editor of the Duffy and Bentley Report. Matheson is a consultant with the same firm and is a contributing editor to the Duffy and Bentley Report.

If more than one person will be entering data into the data base, checks may be needed to prevent errors.

through direct data transfer are the most efficient in terms of set-up time required; this relationship eliminates the requirement for rekeying previously captured and stored data.

The data base management software must present data on the screen in a meaningful fashion and must make data available for use by applications software.

The DBMS requires a report-generating facility that can deliver selected data to the screen or to the printer, allowing the user to store the report formats for reuse with new data. The ability of the DBMS to select data and present it to the user in an appropriate, logical and useful manner often proves to be the DBMS' most beneficial feature. Any evaluation of potential benefits associated with a specific DBMS must include consideration of the system's ability to manipulate data and select information more effectively and efficiently than the user could without the assistance of the DBMS.

DBMS systems are used by a wide variety of users — the professional or management people who are occasional users, professional problem solvers or analysts, DP personnel and clerical personnel responsible for entering data into the data base and for making routine queries.

Ease of use for each of these individuals may be interpreted differently. If more than one person is responsible for entering data into the data base, checks



Q & A

(Continued from Page 5)
people like me from breaking in, but even this one didn't do them. For example, after a person tried three times to get in, the system would say, "Invalid, please log in again."

Some places give you three tries and then disconnect you from the computer. The phone line stays active so you can just reactivate your connection to the computer without having to dial up again. The system I was hired to break into didn't disconnect the phone line. I could just stay on that one phone call and keep on trying over and over again.

If you've given three bad tries to some computers, they will totally hang up on you. Then you have to reinitiate a phone

call, and that gets a little complicated. That's a lockout, and it's good security.

I've read that it's best not to make it too hard to get in because then it's even more of a challenge.

Well, I don't know. I always try the easiest ways first. You can attack a system at a few obvious points and I always try them first because a lot of places don't have very sophisticated security. A lot of the older systems that have some security ignored these spots and those are the ones I usually hit up first.

What if organizations just made important files unattainable?

That would be tough. I got into my school's computer at the highest level, which was also the weakest link. If you can tie into the system as an operator, there's no protection against you. An operator is in the higher echelon and should not have any restrictions. Therefore, there's no protection. There always has to be at least one user with access to everything, so there's always the chance that a person is going to get in at that level. If you make it simple for people to get in, no matter what you do after they're in, they have entered your computer system. Once they're in, very little can be done to determine what they're doing on the system. The only real way to handle this situation is to have an operator keep tabs on

what everybody is doing on the system. But computer protection on that kind of scale is difficult.

What about not allowing certain files to be written to — for example, preventing someone from writing a zero balance on a charge card?

In that situation, if a hacker tries to run the program that says you can't write to it, he won't be able to. But if the hacker can get in the system, he can access those files through a program he writes himself or by directly entering the file, not going through any particular program.

You'd get into the file at a level high enough to let you change it?

Yes. As a matter of fact, a friend of mine issued himself a charge card and had it shipped to a post office box. He gave himself a \$10,000 credit limit. He destroyed the card when he got it because he didn't want to take any chances. It can be done and it is done easily.

Have you ever done anything just to prove you could do it?

I've gotten into the school's accounting and grading systems, but I didn't change anything. Most of the fun is getting in. To damage anything is stupid. When those 414s [Milwaukee's area code, referring to the students who entered the computer systems at Sloan-Kettering Cancer Institute in New York, Los Alamos National Laboratory in New Mexico and Security Pacific Bank in Los Angeles] went into the hospital files, there was no point in changing the file. All that can do is hurt somebody, and the hackers aren't going to benefit. I could see somebody wanting to break into a charge card company, issue themselves a card with a high credit limit and go up and charge up a storm. But to me, more of the fun is in getting into the system than in doing actual damage or making relevant changes to the system.

What kind of computer have you used to get into mainframes?

The one I used the most was a Radio Shack Model 100 portable computer because it has a modem and dialer built into it. I can dial up any computer system and just start throwing out text automatically. I can start throwing random passwords at it and trying random sequences and things like that. I set it up to go all night and keep on trying. The problem with that computer is that it doesn't dial into Touchline, so it's not good for breaking into some of the long-distance services. For that, I use an IBM PC with a Hayes modem, which does have Touchline capabilities. The Radio Shack now sells for about \$300.

In this kind of break-in is really happening on a large scale?

It's done all the time. I recently got an advertisement from a local college about a computer security seminar. I haven't gone to it, but I'm sure some geniuses somewhere are figuring out more ways of protecting systems. That's OK; it just gives us more room to play.

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Products

PALO ALTO, Calif. — Micro Focus, Inc., recently announced Professional Cobol, a fully integrated package for the IBM Personal Computer, that combines eight programming tools, including a full screen source code editor; a forms screen painting tool; a high-speed GSA-certified high-level Assembler 74 Cobol syntax checker; animator; compiler; and run, library and build tools. Transition between tools can be accomplished with one keystroke, according to the vendor. Professional Cobol provides programmers with the ability to perform sophisticated Cobol applications without using mainframe resources.

Professional Cobol costs \$3,000 per copy and operates on the IBM Personal

Computer, Personal Computer XT, Personal Computer AT, 3270-PC, 3270-PC/C, 3270-PC/CX and Portable Computer as well as 100% IBM-compatible microcomputers.

It requires two double-sided disk drives, or one drive and one fixed hard disk, and PC-DOS 2.0, 2.1 or 3.0. For additional information, contact Micro Focus, Inc., Suite 400, 2465 E. Bayshore Road, Palo Alto, Calif. 94303.

PRINCETON, N.J. — Martin Marietta Data Systems, Inc. has introduced IT-Software — 10 separate decision support and data processing programs. Each can be purchased and used separately, but all reportedly communicate with each other.

At the core of the IT system is Keepit, a relational data base management system used for activities including data entry, data maintenance and reporting.

The other programs available in the series include spreadsheet, graphics and word processing, plus Linkit for personal computer to mainframe communications and Facilit, which provides the capability for high-speed, bi-synchronous or Systems Network Architecture file transfers.

The modular series is purchased separately, and packages range in price from \$100 to \$500. All can be run on an IBM Personal Computer or 100% IBM-compatible computers. Memory requirements range from 64K bytes to 256K bytes. For details contact Martin Marietta Data Sys-

tems, Inc., P.O. Box 2392, Princeton, N.J. 08540.

WESTBORO, Mass. — Mitchell Management Systems, Inc. recently announced Quick-Plan. The Executive Project Planning System. Quick-Plan builds project plans based on time, cost and resources through a series of menus written in conversational English.

The system provides 13 different report formats. Zoom, spread and isolating graphics are also available in screen and hard-copy mode. Networking features are in place to avoid resource scheduling conflicts that do not affect project duration.

Quick-Plan is priced at \$995 and runs on most computers that utilize MS-DOS 2.0, including Data General Corp.'s Desktop Generation, Digital Equipment Corp.'s Rainbow, Hewlett-Packard Co.'s HP 150, IBM's Personal Computer, Compatibles and Wang Laboratories, Inc.'s Professional Computer. The program requires a minimum of 384K bytes random access memory and either two disk drives or one disk drive and one hard disk. For more information, contact Mitchell Management Systems, Inc., Westboro Office Park, 2900 W. Park Drive, Westboro, Mass. 01581.

RIDGEWOOD, N.J. — Softest, Inc. has announced Sofcom, a terminal emulation package that allows users to access a wide variety of data bases, electronic bulletin boards and electronic mail services and runs under both MS-DOS and Unix.

Sofcom presents a single menu with choices such as Dow Jones Retrieval Service, MCI Communications Corp. MCI Mail, The Source and CompuServe. When a service is chosen, the software will dial up, connect and log on.

Of special interest is the ability to record the entire session, record partial sessions, upload to electronic mail services, pretyped messages from a word processing program and temporarily escape into the Unix or MS-DOS operating system, look up something in the data base and, without disconnecting, switch back to the interactive communications session.

Sofcom will be available in March of 1985 at a cost of \$100 for MS-DOS computers and \$300 for Unix computers. More information is available from Softest, Inc., 555 Coffie Road, Ridgewood, N.J. 07450.

SAN FRANCISCO — Vdam, a new software product that provides a fast translation module for the micro-to-mainframe link, was announced recently by **Phaser Systems, Inc.** With Vdam, each user can have access to specific pieces of information on the mainframe without having to upload or download entire files. Mainframe files are formatted as if they were stored on hard or floppy disk drives under the PC-DOS or MS-DOS operating system. Each virtual drive on the mainframe can contain up to 10 million bytes of information, and each personal computer user can have up to four virtual drives. Vdam also provides automatic or discretionary backup of files on the mainframe. In addition, the software allows the management information systems manager to decide who gets access and what can be accessed and contains statistical functions that help to monitor patterns of mainframe usage and to antici-

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Products

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Vitem, including the mainframe software and the five personal computer nodes, will cost \$4,950 and will be available in March 1985. The mainframe requirement is Vitem, and compatible microcomputers include the IBM Personal Computer, IBM-compatible computers and those available from Wang Laboratories, Inc. and Texas Instruments, Inc. For details, contact Phaser Systems, Inc., 435 Sacramento St., San Francisco, Calif. 94111.

WOBBURN, Mass. — Imaging Technology, Inc. has announced Image Action, a high-performance, interactive image processing software program for IBM Personal Computer-based systems. Centering around the use of menus and an optical mouse, the software requires no programming skills and users can become proficient in manipulating images quickly.

Used in conjunction with Frame Grabber, a board that plugs directly into an expansion slot of the IBM Personal Computer or 100% IBM-compatible, the operator can move the mouse-controlled cursor over a menu of possibilities to select the operation to be performed.

Some of the operations available include acquire and clear images, image filtering, image processing, graphics and save and restore.

Of note is the software's ability to work on an "area of interest" principle. Instead of altering peripheral or background parts of an image, Image Action can focus on a particular subsection of the image, which speeds up the image processing function.

In addition, on-line Help facilitates the learning process and eliminates the need to search through manuals for command descriptions.

Hardware configuration includes an IBM Personal Computer XT or Personal Computer AT or 100% IBM-compatible, with 512K bytes random-access memory, single diskette drive, display screen, 6087 math coprocessor, PCVision Frame Grabber, three-button optical mouse, video camera (RS-170 or RS-330) and high-resolution video monitor. Image Action costs \$995 for a single license, and Frame Grabber starts at \$2,995 (camera and monitor not included). Details are available from Imaging Technology, Inc., 600 W. Cummings Park, Woburn, Mass. 01801.

SAN JOSE, Calif. — An enhanced version of Easywriter II has just been announced by Seacord/Bus Micro Software. The new version includes a correction speller, line drawer and automatic printer selection. The correction speller adds to the existing 68,000 word dictionary and suggests alternatives to the misspelled word. The line drawer is a facility for creating bar charts, graphs, time lines and organizational charts within a document. The line drawer permits entire documents to be prepared without using a separate graphics program. The automatic printer selection lets users select from a list of more than 70 printers to configure the system automatically.

In addition to the enhancements, Easywriter II integrates with all other packages in the Sorcim/IUS Easybusiness Systems Plus Series.

Easywriter II carries a suggested retail

price of \$395, and current users of the earlier version of Easywriter II can obtain a package with the three new features for \$79.

Easywriter II runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT, 3270 PC, 3270 C, 3270 GX and other 100% IBM-compatible computers under DOS 2.0, 2.1, and 3.0. It requires a minimum of 192K bytes random-access memory (RAM) alone and 320K bytes RAM with the Easyplus windowing program, although 512K bytes RAM is recommended for the latter.

OAK BROOK, Ill. — CDI Systems, Inc. has announced several enhance-

ments to its Trio software package. Trio enables users to download files from an IBM mainframe to the personal computer, extract information, convert the extracted data into the desired spreadsheet or data base format and upload to the mainframe.

The enhancements allow users to convert Ascii files into Lotus Development Corp.'s Symphony and Ashton-Tate's Dbase II and III formats and also supports the WYS format used by 1-2-3 and the IBM Document Interchange Facility (DIP) format used by a variety of spreadsheets. In addition, a new Data Export feature allows users to move spreadsheet data from 1-2-3 and Symphony into Ascii format for uploading to many mainframe

data base systems. A third enhancement provides for loading of new data into existing spreadsheets and movement of data and formulas between 1-2-3 and Symphony spreadsheets.

Trio runs on the IBM PC, PC XT, 3270 PC or compatible systems equipped with two diskette drives or one drive and one fixed disk. The package requires 256K bytes random-access memory and DOS 1.1, 2.0 or 2.1. Trio sells for \$395, and the enhancements are free for the first 90 days; beyond the 90-day period, a membership to the subscription support services guarantees enhancements for one year and costs \$49 from CDI Systems, Inc., 2803 Butterfield, Oak Brook, Ill. 60521.



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